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#### **NEWS IN BRIEF** ICL succeeds with DHSS

A CONTRACT for four ICL 2950s which could lead to orders for a further 22 has been awarded to ICL by the Department of Health and Social supplementary benefits, which

Bath in 1981.

#### RAC automates

MEMBERSHIP, subscriptions, and accounting are among the functions to be handled by a PDI'-11/34 being installed by the Royal Automobile Club. The systems are being implemented in Filetab by consultants Pactel in conjunction with Ace Micro-

#### Council switch

SWITCHING from its ICL 1902T. to in ICL 2956, Camden Council ha; become the ninth London burough to install a 2900 range system. The £750,000 machine win be delivered early next year and will then handle online database applications such as housing, finance and social services as well as supporting a network of VDUs.

#### Turnover doubled

THE Systems Designers group reports a turnover of £2,756,483 for the year ended January 31. more than double the previous year's figures of £1,326,938. Pretax profit was £221,574 for the group, which comprises Systems Designers and Systems Production. The NEB has a 26% holding in the company.

#### \$15m contract

IN a continuation of its business with OEM printer specialist Dataproducts Corp, Burroughs has placed a \$15 million contract for microprocessor driven 320 and 650 1pm printers.

Coming of 'people amplifiers'

have evolved sufficiently for a training he required.

rent computer trends and as such way into every part of our lives." were not predictions.

Taking that as his base, he explained that a people amplifier appliance would provide an in-

vices known as "people amplifier said Joseph. "Quite soon computers appliances" to be produced, accorwill be reduced to a nut and bolt ding to Farl Joseph. "Joseph Haller" will be reduced to a nut and bolt pagate, harvest, and process whatding to Earl Joseph, Univac status. This will happen because it is uneconomic to produce small uturist. is uneconomic to produce small speaking at a conference in the numbers of a particular machine as South of France last week, Joseph we do now. In the future, millions, if said such "futuristic forecasts" not billions of copies of a design will were strict extrapolations of cur- be made and they will find their

One novel example he added, was

complete computer to be fabricated "I see technology producing the crops and then selling his produce as a single component, and de-library, school, or office on a chip," at a market, he could, in the future,

Turning to another area, Joseph projected computer trends over the next decade.

In terms of automobiles, it would be possible to devise vehicles with automatic collision avoidance systems that would need no operators or drivers and have little need



certain just what it is that CGE

is rejecting. It could be that the

electrical and electronic giant

objects to CII-HB moving into

markets such as office automa-

tion and banking which would

well want to retain and even

to influence CII-HB's expansion

plans. Another possibility is that

terminals companies to CII-HB.

sac and Sintra.

# Security. It was won in open tender with many other suppliers and is to automate the processing of incapatity the processing of inca supplementary benefits, which at present is done manually. A twin 2950 development system will be installed in Reading and a pilot trial will begin in Bath in 1981. Further trial will begin in Bath in 1981.

the other major French shareholder in CII-Honeywell about the future direction of the

Another blg industrial company, St Gobain-Pont-a-Mousson, is keen to take a substantial shareholding, and the

rejecting a request from the French government, but neither CGE nor the Industry Ministry will divulge details of the re-

The statement starts by noting that CII-HB's financial and technical performance since satisfactory and in line with the company plan which CGE in-

It then goes on, "CGE has request, it is impossible to be

noted the new arrangements envisaged by the government for the development of CII-HB, and the conditions under which CGE is being asked to assume responsibility for this development vis-à-vis the State. After close study of these arrangements, the board of CGE has

ready to buy. Compagnie des Machines Bull holds 53% of the shares in Cli-HB and Honeywell has the remainder. CGE and the French government each holds 20% of Machines Bull, and the remaining 60% is held by small

Bangkok Bank orders Magnusons WHAT is believed to be the first

order for IBM compatible Mag-nuson M80 mainframes outside North America has been placed by the Bangkok Bank in Thuiland. The order was placed with Magnuson ATC, the UK based agency that covers Europe, the Middle East and fir The machines on order are

two M80 Model 43 machines the 43 being the biggest processes currently offered by Magguson It provides 30% more power than the IBM 4341 and according t Magnuson ATC, the Bangkot Bank selected 43s in preferent to two IBM 3031s. The back currently operates two 370/14x One Model 43 will be delivered

to Bangkok in late September and the second machine will k bring it into direct conflict with installed next year. By then both CGE subsidiaries such as Tranmuchines will be field upgradable to their full power rating i If this is the case, CGE may the moment M80s being delin ered are older, less powers increase its shareholding to try models because Magnuson is holding off finalising the specifications of the Models & the government wants CGE to and 43, which both outperfor turn over its small systems and the 4341, until deliveres of the IBM machine start east?

year (CW, April 26). A third possibility is that CGL Magnuson ATC said thisis now prepared to sell all or part sending a system swift of its stake in Compagnie des specialist to Bangkok Machines Bull, the holding based there permanently. Hr. company for the French shares ware maintenance will be had in CII-HB. If so, St Gobain is: led by ITS, a subsidiary of Sit. the international inter-sin

data networking organisation Magnuson ATC was set late last year to sell Mass 101 air transport industry but is 16. dealing with the IBM COS munity in general because dividence of demand (CW, July li



#### **CW** Ball will raise funds for Braille unit able unit which can provide word processing from cassettes.

#### 3033 an H series model?

WITH the likelihood that IBM will replace the 3032 with a cutdown version of the 3033 (CW, July 19) US observers are seriously considering the possibility that far from being a stop-gap machine with a short life, the 3033 could be an embryo H-series model.

They say that several unused sockets in the 3033 processor could be there to accept ping-in modules to make up the distributed function architecture expected in the H-series. If this expected in the H-series. If this were the case, the performance of the 3033 would probably be enhanced to make it the H2 model, with the cut-down version becoming H1.

#### BCS grades

PROPOSALS to simplify the grading structure of the British Computer Society have been accepted by its council (CW, July 19) and are to be submitted or approved by the membership at its annual meeting on October 12. Under the new plan, there will be three professional grades of membership, Licentiates heing merged into the Associate

#### Heip for blind

THE year long evaluation of a Kurzweii Reading Machine for the blind (CW, March 30, 1978) is to be carried out at St Dunstan's. ondon in conjunction with the Royal National Institute for the Blind. The two institutes have jointly bought for £10,000 one of the first production models of the US machine and intend to train blind people to use it.

#### PO offer rejected

THE Post Office offer to staff in the Society of Public and Civil Servants has been rejected (CW, August 2) and the strike, which has been holding up the processing of telephone bills, is to continue. The SPCS is seeking more than the 198 than the 18% proposed and also wants a firm commitment on Career paths and regrading.

#### Report for DPP

ations about alleged financial fregularities at the Plessey communications plant at ge Lane, Liverpool, It has alleged that government Fins in the plant, which is a straight have been misappro-

### Alame change

Eparent company of Univac, erry Rand Corp, formally anged its name to Sperry Corp the annual shareholders

London, complain that they name to deathey were re-insuring computer leases. They say they were led to believe that the retting last week.

#### 4 TP monitor

exercised, Fujitsu's holding in Memorex into the mainframe the merged company would be

VersaBraille, is that Braille notation can be which uses moveable pins to present 10

merger talks

For the first half of 1979. Amdahl had turnover of \$144 million and Memorex \$359.2 \_million;-Assuming-that-each company does at least as well in the second half, the merged company would have a turnover of just over \$1,000 million.

This would place it just behind Digital Equipment Corp. CII-HB France and Britain's ICL in the league of major computer systems companies.

Anidabl has hitherto specialised in large-scale general pur-pose IBM compatible CPUs covering the 370/168 to beyond the 3033. Memorex manufactures and markets IBMcompatible disc drives, tape drives and 3270-type terminals. It also makes a communications processor alternative to the IBM

planned performance levels.

The Leeds network will use the X25 protocol and will have satellit inicomputers, each accessible by any terminal in the network.

# POLICE report has been sent to the Director of Public Prose-saions about alleged financial \$20m suit names itel

FOLLOWING Itel's suit against its insurance broker and the Americas Insurance Co of New Orleans (CW, August 2), nine European insurance companies are now suing the same defen-dants, plus Itel and its agents, for

Braille is input by means of a keypad and are the balance. at this year's Computer Weekly Bull. An the operator can check on the stored infor-

Price 18p

eight pounds, incorporates a standard V24 pleted her first year. Cost of a VersaBraille unit is £3,500 and it frame to retrieve data. It is also possible to is intended to raise the bulk of this at the

Thursday, August 9, 1979

It is planned to place the first unit on

where a blind computer science student,

Anne Telford, has just successfully com-

companies in the computer industry to don-The year's Ball, which is once again under the patronage of the British Computer important feature of the equipment, the mation with a Braille notation readout

Society, will be held at the Royal Lancaster Hotel, Lancaster Gate, London, on Friday, notes during lectures. At the same time an audio recording of the lecture can be taken.

It is planned to place the first unit on permanent loan at Hatfield Polytechnic October 12. Tickets cost £17 each and in clude dinner, cabaret and dancing until 2 am. Companies wishing to book complete tables for 10 or 12 people should contact Chris Hinwell, Room 125, Dorset House, Stamford Street, London SE1 9LU. See

at risk in Nigeria following the nationalisation of BP's interests there, is the small but fast-

> delegate to the Commonwealth conference Major-General Henry Adefope, that Nigeria had "more tricks up its sleeve" if the move against BP did not have the desired effect, convinced observers that other British companies are in line for nationalisation. ICL's business in South Africa would make it a prime target.

employs 92 people and is already 40% Nigerian-owned. ICL has sold shares in the company to local interests during the past 12 months to meet the requirements of the Nigerlan Enter-prises Promotion Decree.

possibility of nationalisation and was unable to say how many of its machines were installed in Nigeria, but last month it announced a £1 million order for two 2904s from the Nigerian National Petroleum Corp (CWI,

IBM has run into serious problems on the System 38 database computer for small business full and the easy-to-use versions tended. The new 64K-bit chip is applications and will not now begin first shipments until mid-0, almost a year late.

a disastrous venture, which

Memorex pioneered the

manufacture and marketing of

1BM-compatible processors with its MRX 30 and 40 in the early

Memorex is Amdahl's second

choice as partner. The company

discussed a similar arrangement

The reason given is that more me is needed to integrate and test the advanced programming technology in System 38 to meet

The problems present a golden opportunity for ICL to capitalise on IBM's misfortunes with the new 2905, not only in the UK but particularly on the Continent, where IBM has a much bigger System 3 base.
The 290X series has been con-

sistently successful in the System 3 market, at which the Sys-

### CONTENTS

Itel is mystified at being named in the suit saying that it: was not involved in the re-Focus on midsummer bu Pay as you use scheme Pay as you use congree
Downtime by Chad
Letters to the Editor
st. 500m bredit for IBM
Michie on a success story
Programmer Notes
Software File

JOB VACANCIES

Hesh Wlener writes from New York. The reason for the delay is

System 38 requires many more instructions than had been in of the IDMS database manage- used in the System 38 control store and because it is a compa-

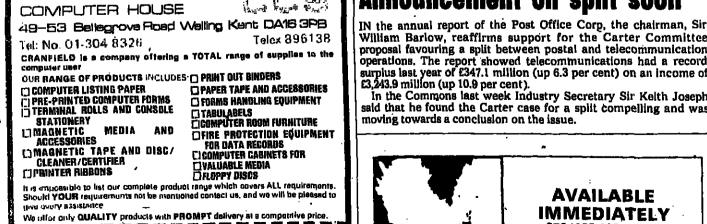
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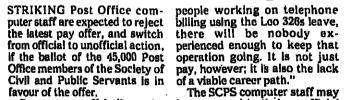
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Civil and Public Servants is in Computer staff believe the be supported in their unofficia offer (CW, July 26), worth bet-ween 18.5% and 19%, does not members of the Civil and Public give them parity with the Servants Association and some

private sector or with Post stores control staff. An SCPS spokesman said,

THE threat of strike action by computer staff at the five main clearing banks (CW, July 19) has now been removed following a revised pay offer. The five banks

#### Bank offer doubled

# Announcement on split soon

IN the annual report of the Post Office Corp, the chairman, Sir William Barlow, reaffirms support for the Carter Committee proposal favouring a split between postal and telecommunication operations. The report showed telecommunications had a record surplus last year of £347.1 million (up 6.3 per cent) on an income of £3,243.9 million (up 10.9 per cent).

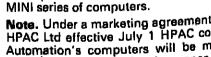
In the Commons last week Industry Secretary Sir Kelth Joseph

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£750 each inclusive of maintenance. For further information please contact:

London Place St. Clement's,

#### rants which can be exercised at any time to bring its holding up 3705, and magnetic media. The merger would take to 32%. If the warrants are not Leeds confirms order

CONFIRMING its order for an Amdahi 470V/6 as the host for its time sharing network (CW, August 2), Leads University has announced that it is evaluating the Michigan Terminal System, as an alternative operating system to IBM's VM/CM5.

Number 665

taken silently, enabling a student to take characters at a time.

The VersaBraille, which weighs about

interface and can be linked to any main-

between Amdahl Corp and

peripherals specialist Memorex

to create the fiercest competitor

IBM has yet faced in the large

systems market, if the talks

prove successful\_Amdehl-would\_

ake over Memorex by issuing

1.2 Amdahl shares for each

Memorex share. With about 8

million Amdahl and about 17

million Memorex shares on

issue, this would leave Amdahl

stockholders with almost 64% of

the new Amdahl-Memorex

company. Initial market reac-

tion was that the proposed share

exchange seriously undervalued

Fujitsu of Japan, which sup-

ies components and assem-

bles to Amdahl, and tape drives

and some disc drives to

Memorex, has about 27% of

Amdahl at present, and war-

Memorex.

MTS was originally developed in the late 1980s at the University of Michigan on an IBM 380/67 and now runs there on an Amdahi 470V/7. It has also been running at Newcastle University since 1989, first on a 380/67 and now on a 370/168.

The companies, which are all in the re-insurance business in

insurance involved trucks and

insurance contracts... Meanwhile Itel, which had been expected to announce a loss of at least \$20 million for the second quarter (CW. July, 26), losses for the period will be

#### Wilby joins Nexos board

L Dataskil is reported to have unched a VME/B TP monitor plet of the Kuture scene, Dr. mighager of new product development to lCL's TP Option, is libred to particular application.

A WELL known figure on the ton Keynes, and is at present unched a VME/B TP monitor plet of the Kuture scene, Dr. mighager of new product development to lCL's TP Option, is long modular, allowing it to be during ments.

A WELL known figure on the ton Keynes, and is at present increased to keynes, and is at present mightaneous present for the NEBs office systems firm. Nexos as development director. Charge of the tip interest will be in overging the increase of Xerox a now-defunct, and is at present mightaneous present min

Software fine
Puzzier

Puzzier

Op Spot on the job market
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Computers in banking
Hencohat as fingerprints
Abdent's seous figure

Spies and Marketing Sit.

Nigeria growing ICL company.
Veiled hints from Nigeria's

ICL Nigeria is fairly large by Third World standards. It

ICL had no comment on the

# Turn to back page

The merger move was foresha-

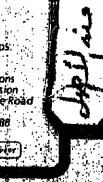
"If there were a shortage of com

dowed by Dr Gene Amdahl in a CW

IN what should prove a windfall tem 38 is targeted, and the 2905 that IBM has found that the for its competitors, notably ICL. uses the proven hardware of the complex operating system on 2950, and features an improved operating system and both the

communications equipment network controllers.

Modems A fully integrated range of high a quality modems. Speeds from 1200 to 9600 bps.



favour of the offer.

"Because of this situation, we

are seeing a very rapid turnover of staff, and if just two more

disagreement should improve its Pascal compiler validating package

AN extensive suite of programs for validating Pascai compilers is being distributed by the National Physical Laboratory. Consisting of 283 seperate programs, the package is comparable with the US language facilities were previously defined imprecularly to help implementers anxious to conform to the current BSI draft stendard for Pascal. According to Brian Wichman, co-author of the suite with Arthur

PO strikers ready to go it alone

original offer of 8.5% to between

banking union BIFU.

l7.5% and 19.5% plus an annual bonus of 2.5% backdated to July I. Only one day of strike action took place during the dispute which has been handled by the

Pension pressure

NCR workers at Dundee who have been staging an overtime ban in a bid to win better pension terms have threatened strike action when they return from holiday this month. It is

Note. Under a marketing agreement between CALLIdem
HPAC Ltd effective July 1 HPAC compilers for Compiler
Automation's computers will be marketed by HPAC it

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some form of midsummer bug is

equal in the random nonsense

august British Computer

ever escalating list of irrelevant

working parties is a Vet advisory

group. Just the place, presum-

battle lines are drawn up.

ably, to take your troublesome

Even more strangely, a task

IF any proof is needed that data processing managers are an extremely responsible and professional bunch, the survey on privacy by the Institute of Data Processing Management (CW,

licensing would be a more effective means of control than the Data Protection Committee's preference, registration; 85% feel spot checks from an external authority should be introduced; 76% feel that computer staff could have problems of divided lovalty if their managers tell them to do things which they believe are contrary to a data protection code of practice; 49% believe data protection laws will put a serlous burden on management; and 62% feel the proposed £26 registration fee for each application suite to be rea-

So much for statistics. Behind them lies a willingness to accept and adapt to data protection laws if they are introduced. And, perhaps surprisingly, there emerges from the statistics and comments the view that the proposed laws are not strong

More than half of those surveyed opted for licensing, a stronger form of control than registration. One comment was. With registration the control would be essentially a negative one which would have less chance of gaining acceptance and credibility.

An overwhelming majority also said spot checks would be needed. One respondent said, "Self-registration is a nonstarter as far as effectiveness is concerned." Another said, "The spot check, if backed by hard enalties, will keep all on their On the question of whether

legislation would be a serious burden, the comments were more revealing than the statistics. It was here especially that the professionalism and resconsible attitudes of data pro-

In between setting-up lost

its distinguished council room.

reported comments concerning

management have come under

It does seem rather unfair to

blame DP managers for much of

the ills of the computer industry.

heavy assault.

Further North, the bug seems

JUST why the sundry organisa- academic exams - while prob-

tions responsible for the welfare, ably even fewer would pass. In

destiny and often fortune of the any event, the IDPM would

computer industry have been appear to be catering for this

hard to define. Each appears to causes, the BCS has announced,

be going to great lengths to with much relish, the acquisition

convince us that they have no of a Presidental Chair to grace

First in the compile run is the to have bitten the NCC. Its

Society. A recent addition to the the value, or otherwise, of DP

force has been created to com- to be hedging its options by

bat declining membership. The appointing an expert on IBM to

selected target is apparently the an advisory committee. Its first

DP manager; but this venture advice should be to ask the NCC

seems doomed even before the management to stop rocking the

Few DPMs would contemplate taking the necessary

The pace of technology and development is escalating fast.

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Applications for copies of the Summary of Operational Require should be needed, quoting reference CEH/37, to:

DP boat.

struck simultaneously with particular market.

# Professional July 26) provides it. The bald statistics emerging from the survey are that 53% of data processing managers say attitude to privacy

a professional attitude.

Most of the suggestions were

on the lines of, "Take advice

"Refuse in writing, sending a

copy to the Data Protection

Authority, a professional body

and the local MP," and even,

"Stand up and be counted." One

respondent suggested there

should be an official form an

employee could use to advise the

employer that the code was

being contravened. A copy

would be sent to a professional

body and the person would be

immune from prosecution by the

All these statistics and

comments are extremely

important if data protection

laws are going to be introduced

- and be successful. For they

are the views of the very people

who are going to be making sure

their organisations stay in line

It is heartening that com-

puting people are adopting such

positive attitudes towards data

protection, but the authorities

fessional in drawing up and en-forcing the laws, otherwise they

will not get the respect of the

This last point is amply illust-

rated by the outspoken response

to the Data Protection Com-

mittee's recommendation that

one of the eight to 12 members

of the Data Protection Authority

board should be a data proces-

negotiations. One result of the

present problems could well be

an increase in distributed pro-

Spreading the load could

reduce the vulnerability which

users face from centrally based

computing operations. Or per-

cessing systems.

of DP installation teams as a haps the BCS could divert a sur-

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MINISTRY OF DEFENCE

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Proposals are required by 14 September, 1979.

union lever in company plus task force to the rescue?

computing community.

nust be seen to be equally pro-

with the law.

from a professional body,

cessing managers emerged. Typical comments were, "Managers must learn to live with it," "Management cannot expect to avoid this burden," and, "Management exists to carry such serious burdens."

These comments showed a commendable sense of responsibility among managers, especially when considered with the costs they expected to incur in implementing the laws. For 69% said their organisation would be affected by the laws, and estimates of how long it might take to amend systems to cater for the laws went up to five years in some cases, although most respondents felt it was

impossible to estimate. And of the 62% who said the £26 application registration fee was reasonable, many pointed out that it was a trivial sum compared with, say, the cost of maintaining the system.

On a related matter, 72% felt it would be possible to give individuals access to personal information held on them. although some respondents said the costs would be astronomical; but 73% did not think it feasible to get the consent from each individual every time data about him or her was put to new use.

with next year's technology

probably being available this

year, therefore an ever higher

degree of ability and skills will

be demanded from the DP

This is particularly true at

present with the increasing use

field trials.

One problem identified by the survey was that of conflict between stuff and managers if the staff felt they were being asked to contravene any code of practice which could be introduced. Three-quarters of the respondents thought there would be a

... on a midsummer bug

puting specialist was not en-Comments included, "They must be joking," and, "Any one DP expert is only an expert in one field of DP. And the responsibility would be too great for one man." This response must be noted

pondents said that one com-

seriously by the Data Protection Authority if it is to have any credence in the industry. For if that credence is missing the survey showed that, despite the evident professionalism and responsibility of data processing managers, if they do not respect the laws and the regulatory body, they will find ways around the law. Over 60% felt that the legislation proposals would not catch those deliberately concealing information about their

use of personal data. Data Protection Authority, be warned. It is now up to you.

# lèn years

**COMPUTER WEEKLY** AUGUST 7, 1969

IN a surprise move, IBM is nounced that software for a new System 3 miniconputs would be unbundled . . . . report by the Netional Come for Educational Technologiunged that £2 million of puts money be spent over the £3,470 to £4,880 and mail hought to be the forerunsed

THIS week's example of the strange things people say in the mid about computers was sent in by N. P. Hawkins of York University Department of Computer Science, who wins £5.

Designer Mr John Shields is hoading a team of researchers, writing collaboration with scientists of York University, expanding to principles to produce instruments of rapid analysis for grain advise other foodstuffs. . . . Mr Shields' experts include blockstature micro-processors from both sides of the Atlantic.

# **Wikes TERMINALS**

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GOVERNMENT COMPUTING Ministry of Defence, West Cormany

SIX MINI-COMPUTER SYSTEMS for order processing to be supplied on a turnkey hads to British Army in West Germany Installation of first system than September 1990

than September 1980, Applications for Operational Requirements, quoting

should be made within one week of the publication of the computer Agency, Room \$22, Rivews 157-161 Millbank, London SW1 4RT. Proposels must be received by 12 Septembers 179

#### NCC to Royal flush of rain as Charles opens laboratory study micro etc — a saying never more true than when the British weather strikes against the British weather strikes against the British as it did when Cambridge Consultants opened its new establishment on the Cambridge Science Park. Lovingly referred to as the Milton Hilton, CCL's palace was to be opened by no less than the Prince of Wales. The assembled software

dignitaries and profes were scheduled to be standing in the open air to witness the

event, the high spot of which was to be the

Prince saying: "I declare this building open" into a speech recognition system (Apple II microcomputer with speech recognition board from Heuristics) at which

V/7A, plus an attractive option

for users of this machine and of

the 470V/5 have been an-

hardware. This means that users

can upgrade their 470V/5s to a

V/6 and their V/7As to a V/7,

but only pay for the additional

The option, called 470/

Accelerator, has a number of

attractions for Amdahl as well

as its customers. It is available

on rental only, so generating

additional revenue from sold

machines, and it gives Amdahl a

strong selling argument against used 370/168s, which are

cheaper than 470V/5s in the US.

announced, but in the US the

Accelerator package rents for

\$1,800 a month, which allows 20

hours' usage. After that the

usage charge is \$90 an hour.
If it is used for more than 50 to

60 hours a month, it becomes

cheaper to pay for a permanent

field upgrade to a 470V/6. The

performance improvement is

between 40 and 50% and the

Accelerator is activated by a

single command at the operator

console which simultaneously

causes a meter to record the

time that the CPU is active in the

No alterations to software are

needed, and the adaptation is

done within the existing cabinet.

Typical occasions when it might

be used are end of month runs.

unexpected overloads and back

a similar derating of the V/7

processor as was applied to de-

velop the V/5 from the V/6. It

has been priced to encourage

The new 470V/7A implements

enhanced mode.

No European prices have been

concept of usage pricing to power.

ounced by Amdahl.

power when they use it.

TWO projects to study the soft-ware available for microprocessors have been set up by the National Computing Centre. One will concentrate on the high-level languages available. The other will examine application packages, with particular emphasis on the support pro-

covering the software and support they provide. Suppliers wishing to be included should contact Lyndon Morgan, the microprocessor development team leader, at the NCC in

The NCC is also keen to hear from users who have experience relevant to the studies, whose results will eventually be made available in NCC publications.

#### **Black Box** packages

A VARIETY of application packages has been launched by Rair for its Black Box microromputer. High on the list are ales, purchase, and payroli systems developed by Graffcom Microprocessor Group. Rair has also introduced a

stock control system - the first of an integrated range planned hy Allan Data Systems. It will be joined by packages for bill of materials and sales order pro-

Also available on the Black Box is an estate agents package, marketed by its developer. Sword Data Systems.

#### Mark 7 library

EIGHTY-TWO new routines, mainly in the areas of linear algebra and ordinary and partial fferential equations, are inluded in the latest release of the NAG Fortran library, Mark 7. The Mark 7 library is already available on IBM 360/370, CDČ 6000, Cyber, and 7600, Burroughs 6700, and ICL 1906 equipment. Its implementation on about another 30 mainframes

#### Broadcasts on chips A SERIES of six half-hour

Mighty Micro will cover the documentaries on the silicon technological developments in microelectronics and will conilp is to be screened by ATV September, while Piccadilly tadio in Manchester has started centrate on the optimistic side of this industrial revolution.
The Piccadilly Radio series, a series of four broadcasts about

The ATV series has been tures the station's Marion Bowwhich started last week, feavitten, and will be presented by Dr Chris Evans of NPL. with ASTMS leader Clive Jen man. It will include interviews Starting on September 3, the kins and other experts.

#### Apple Dealers' Association

FOLLOWING its hurried formation at the time of the change in K dealership initiated by Apple omputers, (CW, July 5) the UK Apple Dealers' Association has now been formally inaugurated with full backing from the

the silicon chip industry.

Cupertino, California, micro computer manufacturer. Over 50 Apple dealers attended the first meeting last

week to ratify the association's objectives, and hear of Apple's support plans.

loaata 30 ST. JOHN'S ROAD TUNBRIDGE WELLS (0892) 39891 DIGITAL MICROSYSTEMS DSC-2 LOW COST COMPUTER SYSTEM INCORPORATES: ME MEGABYTE of Roppy disk ytomage on two single skilad 8" drives — star 15 te of Main Memory standard — 32K and 48K also sysiliable. M ORK 03 standard a 15XT PROCESSING BASIC GOOD, FORTRAM & PRIDARLE

DOMINOABLE & Add-on Hard, Disk System — Up to 28 Megabytes par MONATA ARE LOCKING FOR DEALERS & DISTRIBUTORS

Because the Science Park was the idea of Trinity College, Cambridge, the sima mater of HRH, vast hordes of Trinity per-

The weather, no respecter even of royal personages, did the obvious thing for such an occasion and organised a large and accurately timed downpour.

This left CCL with a hurried fall-back on

to "Plan B," holding the opening ceremony in an adjacent marques. Not only was it adjacent to the front door, but also the point where Prince Charles was due to arrive—

by a much higher demand for

ned. It costs \$370,000 less than a

470V/7 in the US and provides

Minimum configuration in-

The new option introduces the between 75 and 80% of the

leases than the company plan- a 470V/8.

by helicopter.

The multitide tried to squeeze into the

dignity and panic that only true Brits can affect. All wanted to be near the front, where HE would be.

Vhen the Prince arrived, the proximit of the marques to the helicopter landing point caused a moment or two of penic among those at the back. Helicopters produce a vast amount of moving air, and most

The one Trinity person to come out of the ceremony with dignity was the Prince himself. As far as could be seen, he elbowed nobody out of the way, and tred on not a single toe.

of the technology involved in the opening ceremony, discovering a new royal growth industry along the way.
"I am asked to perform many opening ceremonies," he said, "and this method

will now allow me to send tape recordings to those that I connot personally attend." He was also aware that these speech recognition systems are supposed to be very discriminatory. He asked CCL managing director Richard Cutting to speak the actual "opening" words first, and ited the response with some interest. To Cutting's relief, the door stayed

# The language project will look at the characteristics of various lenguages and their suitability for particular applications. It will also consider the versions of languages and their suitability by government aconomies.

ondon to the regions. A DERATED version of the outright purchase, since cludes 4 Megabytes and 12 470V/7 mainframe, called the Amdahl's business has been hit channels. It can be field

channels. It can be field Home Office computer centre, upgraded through the 470V/7 to the Property Services Agency, and the Department of the Environment, and will either be taken up by the present London staff or filled locally.

Service jobs had been ear-

way they are being marketed.
In support of the studies, the NCC is distributing a questionnaire to over 800 suppliers covering the software and sup-

#### The 250 jobs will be in the Peach upgraces

THE bureau operations of Peach Data Services, Burton-on-Trent are being transferred from a Digital Equipment PDP-8 to a PDP-11/34 installed in the com-Originally, about 30,000 Civil pany's new offices at 181 Horn-

# UKS has Centronics 6000 Series Line Printers EX-STOCK

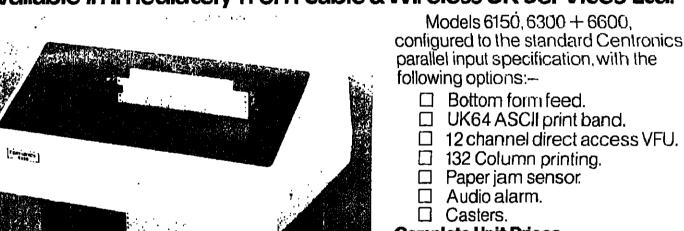
First deliveries of the 470V/7A

and the V/5 Accelerator are set

for September. The 470V/7A

Accelerator will be available in

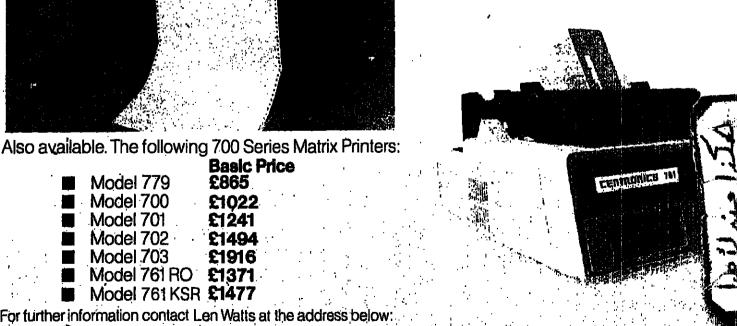
Available immediately from Cable & Wireless UK Services Ltd.

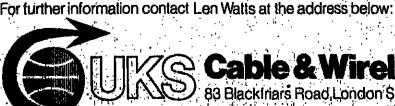


#### **Complete Unit Prices**

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Model 701

Model 702

Model 703

**Basic Price** 

£865

£1022

£1241

£1494

£1916

# Downtime

# Foot slog-1

computing are going unappreciated by the general pubic, take a look at this letter that appeared in the Eastern Evening News, Norwich: I think 28 million for a weather

forecast computer is utterly scandalous when there are so many serious diseases that have to rely on voluntary gifts just for research purposes . There are surely enough people with corns and bunions which do the job of weather reports

(Mrs) D. LANE

#### Foot slog-2

just us well and are cheap

HERE'S dedication for you. A teacher from Horwich, near Bolton, is going on a one-man sponsored walk from Land's End to John O'Groats to raise the money to buy a microcomputer for St Joseph's RC School where he teaches. John Deady is his name, and all I can say is, more power to your blistered feet, John.

I'm sure my employers would be delighted if I went on a sponsored walk to raise money for a new typewriter Still, reaching in these days of flailing Chancellor's axes calls for an extra special vocation.



"We'll just leave them negotiate while we slip out for a

#### Graffito

HO hum. It's the conference scason again, and as I sit through lecture after lecture I ponder on how few are orginal, stimulating, and nonobvious, and how many are none of these. It brings to mind that graffito that understand (second-hand) to be seen on the walls of more and more high-class ladies' loos, and that I am beginning to think is a very apt motto for the late Seven ties "You have to kiss an awful lot of frogs to find one

**Texas 810** 

#### LETTERS TO THE EDITOR

# Prestel leads the world by the nose

Butler, in his letter to you (Letters, July 12), that France and the UK are becoming the laughing stock of the viewdata world. We have always felt that there was not enough laughter in computer services, and fun is one of the secret ingredients in Prestel's success — witness more than 100 games, jokes and puzzles already on the system.

But seriously, while I can understand David Butler's desire for a grand Anglo-French alliance to develop and market viewdata on a worldwide basis, I do think he is on the wrong tack.

Viewdata is one of a long and distinguished series of brilliant technical inventions that have been produced in this country. Too often in the past such inventions have languished for lack of energetic commercial exploitation, and have had to go overseas to be properly appreclated. The Post Office is determined that this shall not hannen to viewdata.

This country has the skills resources, and imagination to exploit viewdata effectively,

duced the Filetab system and I

must put the record straight

Decision Tables as a program-

ming language, when Tom

IT was good to hear from David provided that the project is pushed forward now, in a bold and enterprising spirit. This we are doing. We are years ahead of the rest of the world, and have already sold our technology to West Germany, the Netherlands, Switzerland, and the US. We have created, in Prestel, a whole new industry in the UK. providing business for hundreds of firms, including, I am glad to say, Butler Cox and Partners.

Of course we must move towards common technical standards for the various national viewdata services. And we are working intensively not only with the French, but with many other countries, towards this end. But the task is not as simple as David Butler suggests. In the early days of a new service there will be room for different, and genuinely held, points of view on the right technical solution.

And since Prestel, Ceefax and Oracle have become firmly esta-blished as going commercial services, we must obviously seek to achieve international standards which are "downward compatible" with these existing services. International commitblems, and they are doing so.

But please don't suggest that Prestel should become bogged down in grand intergovernmental ventures. It would be the kiss of death. We have moved from the decision to proceed with Prestel (February 1978) to the opening of an admittedly limited public service (March 1979) at about three times the speed of intergovernmental projects such as Euronet. And grand intergovernmental ventures have a nasty habit of losing touch with the marketplace (cf Concorde).

Prestel is an example of Britain leading the world, not only in invention, but also in commercial exploitation. If the Americans David Butler meets find this funny, they must have a peculiar sense of humour. The Americans I meet are amazed (and frankly a bit embarrassed) to find poor old Britain leading them by the nose into the information society.

#### Dr ALEX REID

version was being developed for

priority to Robinson's require-

ments, Bob commissioned a

software house to produce a -

tailor-made package. I wonder

Because we could not give

the IBM 360 series.

NCC and the Filetab story he and I specified the Filetab - able and being sold for ICL 1900 team which specified and prosystem and persuaded NCC to machines and Bob contacted me

regarding the development of duction, a decision which has this package, for I fear J. E. C. been beneficial to the computing Cartwright's memory is at fault community and NCC. (Letters, July 5).
Filetab is based on the NITA Once it was successfully established, many people have package which was designed. claimed some involvement in written and sold by Tom Barthe design of Filetab. Certainly, nard in 1966-67 and which is still in the later 1960s Bob Johnson in use alongside FTL6. Because and his team at E. A. and S of a mutual interest in the use of

Mrs M. PHILLIPS

what happened to it?

Waitington, Cheshire.

# Amateurs seek computer site

Robinson in Bristol produced a

specification for a parameter-

driven reporting package. How-

THE Southampton Amateur an IBM 360/40 and we have accepted the offer. The computer is now in storage, as we are not yet able to run it due to lack of a suitable site. We need a large building, say 20ft x 12ft with a solid floor and threephase electricity. The running cost will be much lower. £500. than our earlier estimate of £5,000, and we are hoping that we will be able to raise most

Teletype 43

of this cost by charging our more to the needs of our Computer Club has been offered members "at cost," and by limited sponsorship.

We are setting up a special sub-committee within our club to investigate further details of the project, with a vague idea of perhaps putting the computer to some community use, apart 7.30pm. from members' own projects.

The Soton ACC is now just over a year old and we are fairly well known throughout the UK. Southampton, We are beginning to adapt Hants SO2 1HP.

Lear Siegler ADM 3A

01-941 4806 Wetherby 61885 Dublin 971854

enter the field of software pro- at NCC when he learned that a

members, and we organise local talks of general interest. We meet on the first Wednesday of each month, restarting in October, at the Medical Sciences bullding, Bassett Crescent East, University of Southampton, at

P. D. MADDISON

13 Westridge Road, Portswood,

Also available

Visual Displays

Lear Siegler only
AD M3A/Tektronix Graphics £1395

keyboard type. remember some years ago seeing literature on a punch that could handle one card at a time. Authorised UK distributors for all products

very grateful.

ested to me

cletype lines, and

# Benefits of SME

YOUR front page article, "ICL clears the way to 2900" (CW, July 19), does not go far enough in stressing the true significance of SME (Simulated Machine En-

(b) a card punch other than

the older button type or the 029

vironment). SME is not merely concerned with such a narrow field as conversion; rather it is about active transition from a 1900 (or DME) to native 2900.

The concept of SME is that of building an image of the VME user interface (hence "Simulated") within a 1900 environment. This means the coordination of previously free-standing products, for programs and data conversion, into an integrated environment (VME/

B SCL under George 3). The benefits of this approach are that all new work can be written to 2900 standards in a form which can be run under Bilstol 8500 711.

# comment?

MAY I, through your columns thank Computer Weekly and al your readers who responded to our appeal for a Braille online terminal (CW, July 5)? As a result of their help, and also the generous offers of Rolls-Royce at Bristol and the Cumbridge Would not a more usel specification be University Computing Service our students will have interac

I. R. MacCALLUM Senior locture Dept of Computer Science. Essex University

Readers

thanked

tive access noxt year.

# Fair

IN "Gilb's Mythodology" ((w. July 5), Figure 1 contains, an sample of a design specification M.TXT Comments shall be not long; 30% of course. for at least 30% of source lines;

M.TXT The source shall bed sufficient clarity that comment. are necessary on less than Bit. the lines on avg? Dr A. N. WALKI

Dept of Mathematics, Nottingham University.

monitoring the output to five

out what corrections should

By "output", I mean la,

example a valid record from:

data-vet, an updated version 1.

The major difficulty is &

this would appear to be the ??

of suitable methodologies

the file, a continuous rest

# A place for **Control Theory**

MAY I applaud 'Tom Gilb's de- decide on methods scription of the way in which he specifies maintainability, and monitors the attainment of these goals? At the same time, I do hope that his readers will realise that this is only one area among many where the specification of goals and monitoring methods would lead to more satisfactory com-

puter systems. Control Theory has been accepted for decades in many engineering applications, and surely has some use in the "soft"

queries on a database, ussatisfaction with the comple system. These are at differlevels of one top-down he urchy, viz the theoreticals we design. But systems, and muthem, can be looked at anding to other types of goal:

parts of computer systems design. Perhaps one could do a top-down design using a methodology such as Michael Jackson's. For each process on the structure chart, input and output are specified. This is, of course, the desired output, or goal. The final stage would be to

Lancturer to Computing Polytechnic of the South Bas London SEI OAA. More help sought

# for school work

Mrs LYN ANIA

I WOULD like to thank all those It had a dial on the side to who replied to my request for the character to punchand and a lever to cause the \*^ help and advice on computing in schools (Letters, July 5). I have character to be punched: printed. This punch wow highly suitable for us to coreceived much useful data on microprocessors and minis for odd cards in a batch quick use in the school where I teach. it is still being produced and advice on useful publica-Finally I would be please. tions and organisations. I am-

correspond with any helf-PDP-11/34 user, especial culuration. I would like to I would like to use the columns of Computer Weekly once more convenient met more. I wish to trace sources of running Fortran and Ma two items of equipment suggprograms than the med currently have to use via (a) slow, small card readers teletypo linked to an education capable of being linked to 11/34 System.

M. G. PAUL HUTCHING 79 Lanwood Road,

#### North Thammes: CMC, Gordon & Gotch, Heinz, London Transport and Midland Bank. North West: Littlewood VME/B; existing progr systems can be conve TICKET

development and main end users; costs are sprea a chosen and managel period; "split session" works

period; "split session are an eliminated; the jack are being tied in the 19th phillow and computer users and computer users are trained in 2900 techniques." fore native mode is adopted.

fore native mode is

Finally, the relationship ween SME and shared like ween SME and shared like that the latter buys until the former to be adopted in provides a growth path or which are already at or near top end of the 1400 range.

# DHSS in moves to automate benefits

the protection of the single

The pilot involves two twin

2950 installations, but if suc-

cessful it will be applied

throughout the 12 DHSS re-

gions, and require a total of 26

2950s, 26 CR80 front end proces-

sors from Christian Rovsing of

Denmark, and 500 7502 cluster

terminal systems with a total of

The pilot project involves installation of one twin 2950 in-

stallation in Reading for delivery

second, in Bath for the live trial,

It is planned that the Bath

system will serve five local

offices equipped with 7502s, but

it will have to be able to simulate

operation with 226 terminals

The system in Reading will be

used for software development.

Underlining the venerable an-

cestry of the project, the

operating system to be used is

not VME/K but DME. There are

South Thames: Commercial

Union, Easams, Legal & General, National Provident and London Borough of Lambeth, South West: EMI, Rank Toshiba

LADIES

East Anglia: Norwich Union, Pro-vident Mutual and Thomas Cook.

Midianda: Data Sciences, Peterbo-

rough Data Processing, Thorn Elec-

rough Data Processing, Thorn Electrical and Scicon.
North East: Midland Bank Operations, Provident Management Services, Rowntree Mackintosh I and Rowntree Mackintosh II.
North Thames: Case, Lola, London Transport I and London Transport II.

North West: British Nuclear Fuels.

Liverpool Daily Post and Echo, Midland Bank (NWCC) and Wool-

South Thames: Commercial Union, Legal & General II, London University and

Segas. South West: EMI I, EMI II and

COMPUTASTAR

and Westland Helicopters.

at the end of the year, and

tender policy.

2,500 VDUs.

one year later.

Over 200 line up for

Computastars finals

THE line-up is now complete for the finals of Computastars to be Management Control Systems, Management (NWCC)

automating payments of incapacity and supplementary ben-efits, for which ICL has been Tasks, is a development of an idea which was being pursued at that time. This involved instalawarded the pilot system con-tract (CW, August 2), is the latling local computers to serve one est in a long line of attempts by or more payment office. The the Department of Health and plan now is to put one twin computer system into each of Social Security to automate the 12 regions. these applications.

incapacity benefit is believed to be the new euphemism for sickness benefit. Attempts to automate such payments were made and discontinued five panies competed, and indicates that ICL is able to win public years ago (CW, August 15, 1974). sector contracts even without

#### Security worries

WORRIED about security, the US Treasury is taking its payments system, which transfers \$10,000 million weekly to more than 100 government agencies, off a Honeywell 6060 mainframe, and building a dedicated system using a dual Tandem configuration. For added according to be to be presented in a ecurity it is to be installed in a

The Federal Tressury has been concerned for some time that, because of the variety of applications running on the Honeywell machine, it is difficult to control the number of people who could have access to the Treasury Financial Com-munications System.

Designed for ultra reliable

working, the Tandem NonStop 18 computer systems are sold with a minimum of two proces-sors.

the finals of Computastars to be held at Crystal Palace on Satur-

More than 200 computer

people will be entering in a

variety of both team and in-

dividual events, details of which

Supporters are welcome, and

advance tickets cost 60p per

adult and 30p per child and can be obtained by filling in the form

below. Entrance charges on the day will be 80p and 40p respec-

MEN

East Anglia: Thomas Cook, British Steel, Norwich Union and J. H.

tidiands: Scicon, Data Sciences,

Peterborough Data Processing and Thorn Electrical.

North East: Compower, Empire Stores, Rowntree Mackintosh I, Rowntree Mackintosh II and Rown-tree Mackintosh III.

Littlewoods.

O: Computaetars, 117B High Street, Croydon, CR0 1QG.

for the finals of the Computastars Competition at the Crystal

enclose a cheque/PO for ..... made payable to Computa-

Please enclose a stamped self-addressed envelope

will be released on the day.

day, September 29.

tively. Teams are:

Please supply:

···· Adult ticket(s) at 60p

Child ticket(s) at 30p (under 14)

Palace Sports Centre on Saturday, September 29.

Reading, and software which

The contract was a good one for ICL to win, since it was placed after an open tender in offices for statistics. which a large number of com-ICL 'war' with Honeywell Bull hots up

has been developed on these is expected to form the basis of The decision on whether or

will be taken in 1981 or 1982, following evaluation of the pilot system in Bath. The machines in Reading would then be used to collect data from the 12 regional

not to go ahead with the system

# in survey

UK owned Racal-Milgo ranks third in size by turnover in the Top 50 data communications manufacturers in the US, accor ding to a survey published by the

ding to a survey published by the US magazine Datamation.
If the figure is combined with Racal-Vadic, ranked 18th in the listing with a 1978 turnover of \$12 million, then Racal's 1978 turnover of \$75 million is second only to IBM with \$144 million from data communications. This represents less than one per cent of IBM total turnover on all products.

#### Racal-Milgo Banks find \$1,500m third Crodit for IDM credit for IBM that demand for this is way

IBM's borrowing requirement has been met by 37 banks only three weeks after the company announced that it was seeking lines of credit totalling \$1,500 million (CW, July 19).

It is the first time for 12 years that IBM has been unable to finance its future business out of its own resources. The company has not said what it needs the money for, but it is thought to be needed for expansion of production facilities for new products. notably the 4300.

There are strong indications

#### 48, and the 4300 line.

THE unofficial contest between ICL of the UK and year by the relative strength of sterling over the CII-Honeywell Bull to become the largest franc. As a result, at the present rate of exchange, European-controlled computer group is hotting its turnover translates to £230 million and its profit up. Last year, CII-HB was just ahead, but was to £4.1 million. ICL reported turnover of £285.1 growing at a much slower rate than ICL.

However, CII-Honeywell Buil's latest half-year to March 31. figures shows its turnover up 20.6% at FF 2,220 million; growth last year was a much more modest—tending that exchange rate fluctuations make 12% or so.

totalled FF 60.4 million; in the same period last league tables of the world's manufacturers. ICL

million and profits of £18.6 million for the half year

CII-HB deplores comparisons of this kind, conthem meaningless. Clearly short-term changes are Profits were ahead 26% at FF 39.6 million.

French government aid to CII-HB in the first half ones available, and are used by the compilers of prefers to ignore CII-HB, regarding the 47% US-CII-HB is, however, handicapped in the race this owned company as not truly European.

beyond the company's expecta-

The last product for which IBM seriously underestimated demand was the 3030 series. Following the problems created by that, T. C. Papes, who headed the systems products division which has since been split into two, was transferred to an ad-

ministrative position. The men in the hot seats this time round are senior vicepresident Paul Rizzo, who heads the data processing products group and, J. D. Kuenler, who is president of the new systems products division, which embraces the 370 series up to the

#### Amdahl link-up

THE job processing system being developed by Brook Street Bureau (CW, July 26) uses a Datapoint 5500 for data collection and input to the BOC Datasolve Amdahl 470V/6. The processed information is then fed back to Brook Street where job matching is carried out on Delta Data 4000 terminals, of which eight have been installed so far.

# HAMIIION

# For sale or rent. AMORITHMY REMIALS FROM GRAPHICS DISPLAY TERMINALS 3 6 12 months months worths SALE

GITAL	months	nionlins	nionths	SALE	TEKTRONIX	montes	mongris	HORMES.	201
34 DECwriter IV	87	65	55	875	4006-1	200	150	131	
36 DECynter II	87	65	55	875	4010-1	323	243	212	
120 DECwnler III	135	99		1785	4012	424	317	277	
	160	115	95	1095	4013 ASC11/APL	457	342	300	
1120 DECwiter III	129	96	80	1599	4014-1	760	571	523	
180 DECwilerI		64	54	1055	4015-1 ASC11/APL	829	622	567	
[52] DECscope	8ს	70		eágir	4016-1	1311	946	790	٠.
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Real time extensions

on Basic interpreter

By Peter Hewitt

#### MICHIE'S PRIVATEVIEW AI comes of age. THE microelectronic revolution is usually perceived in

terms of whatever is most immediate — to the neglect of more fundamental implica-Every radical new techno-

logy shows this pattern. The significance of steam power was at first seen only as a cheaper way of pumping water out of mines.

When the age of transportation dawned, the use of the locomotive engine to carry passengers at speed was denounced as medically dange-

We even find in Samuel Butler's social funtasia "Erewhon" the new "vapour engines" depicted as taking over

The historian will look back over the early years of machine intelligence. What will he identify as the equivalent to Stephenson's Rocket? A strong candidate will be the Mycin program, developed at Stanford Medical School, particularly in its domain-

independent Emycin form, Appropriately, the opening lecture at last month's AISB

Summer School on Expert from industrial and govern-Systems, held in Edinburgh. began with one of Emycin's latest success stories an Expert System for interpreting tests of lung functions.

The program, Puff, is now in routine use at the Pacific Medical Centre in San Fran-

The lecturer, Dr Edward Feigenbaum, heads the Heuristic Programming Project which he founded at Stanford University in the mid-1960s. He took his audience on a swing through the successes of 14 years' patient dedication to the new craft of knowledge en-

Feigenbaum is uniquely equipped to summarise its emergent principles and his tour of selected case studies set these principles before an appreciative British audience.

The composition of the audience itself marked a new departure. No fewer than 30 of the 100-plus participants came

ment agencies. Artificial intelligence is entitled to celebrate its coming of age when it can show the capability of earning a living. At Edinburgh, it was abundantly plain that this moment has come.

The first afternoon witnessed a presentation by Ray Carhart, originally one of Feigenbaum's Stanford team. now a member of Lederie's industrial laboratories in New

York State. During a year sandwiched between two appointments. Ray worked in my Edinburgh group to refashion the experimental chemistry program, Congen, into a practical

He was able to report the adoption of his new-style Congen by industrial scientists at Shell's Sittingbourne research centre.

But let us not go overboard about applications. The smell of practical success can have

whilf of technological benefit. research sponsors show inclinations to argue that basic investigations can now be let

The real situation is quite opposite. Never has fund-amental inquiry been more acutely needed than when applied successes begin to expose our ignorance of the fundamentals of cognition.

It is from these fundamentals that man-machine consultation systems - if they are to be cheap to make and safe and easy to use - must be struc-

Richard Young, of the Applied Psychology Unit at Cambridge, argued with illustrative variations that the construction of expert systems in the form of pattern-directed rules - now the dominant practical methodology — intimately parallels the cognitive representations of the human

A separate and deep-seated need for basic research arises from the limited nature of Exnert Systems as we know them. Knowledge engineering has so far confined itself to the implementation of such mental skills as can be completely embodied in pre-stored patterns.

We see this kind of problemsolving in human experts whom age has robbed of the power to innovate and learn. Yet these ancients, hide-bound and blinkered, can still surprise by high performance when confined to familiar ground. Eventually, however, we would like to engineer nonsenile intelligences!

Steps in such directions were described by Ivan Bratko and Tim Niblett of Edinburgh, who reported on a chess program able to generate new strategies through conjectures and refutations and by Ross Quinian of Sydney, Australia, who described machine learning in the context of database com-

The second morning beonged to logic programming, a fad of exclusively European origin destined, in my opinion, eventually to carry all before it. J. A. Robinson himself, who started it all with his 1965 paper, "A machine-oriented



published later this year.

column my reactions to it

Summer School's second half.

I shall contain for a future

REFERENCES

Logic, form and function b

Expert Systems in the next

A. Robinson, Edinburgh University

electronic age (procedual of the 1979 AISB Summer School

edited by Donald Michie. Eds. burgh University Press (lect.

racy; for the maintenan

controls to protect pro

enforce these procedures

open to prosecution, note:

So, it argues, will the \$5. analyst who ignores the

trols or the programmer in fails to document his proper is

In its editorial conce

And, to take it !

Press, 1979.

facilities-rich enhancement of logic based on the resolution its 2900 database management principle." opened with a tour system IDMS - ICL is arguing de force which combined that its data management softsparkling clarity with depth in ware is now at least as good as these and other respects to any in the world. The new softmirrored his own tutorial may ware, which has been at test terplece "Logic, form and function" published a fer sites for a year, becomes generally available with release 5X32 of VME/B. weeks earlier!

Different incarnations of The main intention of IDMSX logic programming in the is to offer users more options, language Prolog were & scribed respectively by David Warren of Edinburgh, and by providing several alternative mechanisms where IDMS provided only one or two. It there-Clark and McCabe of Imperial fore stands in the same relationship to IDMS as IDMS does to College, London. Substantial detail will be IDMS-E, the subset form anavailable in the proceedings of nounced earlier this year (CW, the Summer School to be

May 31 and June 7). High on the list of new features is the option to build inverted file structures. The principal file organisation supported by DRMS such as Adabas, this tion was not previously available in IDMS, which is network.

1DMSX supports three file inversion mechanisms; standard record-type inversion using ogical keys; indexed sets based on pointer arrays; and record chaining, which is most efficient for short sets.

Another IDMSX innovation is sequential placement mode. ning the existing random, via set, and direct modes, it has the same characteristics as indexed sequential organisation, offering the chance to optimise for Also addressing DBMS per-

SOFTWARE FILE

hold subsets of a database in rated automatically into the virtual storage. Any convenient dictionary. subdivision of a database can in The dictionary, which is ineffect be held in main memory, tended primarily for online use. eliminating the need for disc also benefits from the high peraccess to frequently referenced formance of IDMS in the 2900

Among other enhancements are further recovery options. almed mainly at speeding recovery of large databases; the option to set up a temporary file before-look images; and a number of enhanced utilities.

data such as tax tables.

ICL tops out its database range

Nearly all the enhancements stem from requests from the existing IDMS user group, which ICL regards as active and very knowledgeable. There are currently over 130 IDMS users on 2900 and about 50 users of the data dictionary system, DDS the other main component of ICL's data management

DDS has matured rapidly since its general release two years ago, being seen by both users and ICL as the hub around which DP developments must

Unlike IDMS, it was implemented by ICL from scratch and it therefore differs considerably from Cullinane's own data dictionary. In its active role, for example, it can generate schemes and record descriptions directly whereas the Cullinane software re-uses the IDMS directory for this function.

DDS uses IDMS as its file handler so that aspects such as recovery - a very strong fea-

All are compatible supersets

cale the choice of operating sys:

Nonetheless, it is a pre-

Compared with System 32.

IBM has, however, decreed that the future for System 3 uses is System 38, designed for transaction

IDMS under VME/B is inevitably re-entrant and multithreading.
This is in sharp contrast to the

virtual machine environment.

equivalent IBM environment, in which programs must multitask in order to multi-thread. ICL has not therefore had to re-architect IDMS to cater for growing online use - a task which both Cullinane and Cincom have had to undertake in the last few years to produce their high-performance multi-(Software File, November 2,

File, June 15, 1978).

#### Lloyd's contract

OGICA has won a contract to extend the ships database maintained by Lloyd's of Lon-don Press. The main enhancement will be the incorporat of ownership details linking the 33,000 vessels currently held in the database to about 12,000

hip-owning companies.
The PDP-11/70-based system is used to produce publica tions such as Lioyd's List Lioyd's Shipping Index and Lloyd's Voyage Record.

#### **IBM** version

PACKAGE Programs has announced an IBM System 34 version of the MMS general ledger and financial reporting system. Written in Cobol, it requires a 48K System 34 and costs £10,500.

#### First fruits

SALES, purchase and nominal ledger, and payroll software for the Adds System 70 and 75 have threading versions, viz IDMS 5.0 been among the first fruits of Gemini Computer Systems' new 1978) and Total 8.0 (Software microcomputer division, Gemini Microsoft, based in Manchester.

A BASIC interpreter, including real time extensions for such applications as instrument control, has been developed by Research Resources Ltd of Welwyn Garden City. It is currently available for the South West Technical Products 6800 and for

the CT-82 graphics VDU. A version of the interpreter which is called LabBasic, is under development for the Commodore Pet and the compatible compiler that will at £25.

Among LabBasic extensions

specifically designed for simpli fying the interface to external equipment are Sense, Flip, and Delay commands for the control of input devices; commands to change the state of output lines: and facilities to generate pauses of known length.

The system also includes an interrupt clock. The two current pany is also working on a com- versions of LabBasic are priced

# 

measure the gap between two components. They can be attached to a key-ring, and used singly, or held adjacent to each other in blocks of two or more,

This week's problem is to work out a circular array of five

FEELER gauges are "blades" of "integer" gauges, such that all various thicknesses with which integer totals from 1 to 21 may the engineer or mechanic can be measured with the technique question is "Which five numbers will do the trick?" and the second "Where precisely must they be placed round the key ring, in relation to each other?

See page 45 for solution.

# **COMPUTER WEEKLY** is holding its Annua Bal

on Friday, October 12 at the Royal Lancaster

Computer Weekly is holding its fourth annual Ball. Last year nearly 700 people attended what has come to be regarded as the computer industry's big night out.

This year the Ball will again be held under the patronage of the British Computer

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#### **PROGRAMMER NOTES**

# **Ultimate liability** for mistakes

IT is all too easy, when involved passed by the Food and fi with the intricucies of a pro-gram, to forget that one's code the adulteration of drugs will ultimately take its place in a "current good manufactor" demanding and dangerous real practice."

world.

There is a temptation, for example, to attach more importance to the program the manufacture and process. importance to the program of drugs.

They call, for example, for examp structure and logic than to the numerical results. The former input of formulae and in are, after all, the more interesting and all ting and challenging aspects of puter to be checked for the

Yet in the long run it is mis back-up files and hardtakes in the latter which will be duplicates; and for apply In many cases, the incorrect and control logs against most visible to the user.

placing of a decimal point will be detected quickly. In some, however, such as un error routine in a flight program, it may not. And the consequences could be very

Similar considerations apply n several other areas, including testing in general and the documentation of program

If the drug turns out to adulterated, failure lot. With the rapid growth of balances is el computer applications and innegligence. creasing dependence on com-Computer Law and Tax puter systems in general, the remarks that it is the potential repercussions of any

But there have as yet been no indications that the ultimate responsibility for a software error could be laid at the feet of the programment.

or not in this Yet many programmer with a sources of information has however, deloped in the US in which a gligent programmer could be sourced by the beautiful to be sourced by the bea veloped in the US in which a negligent programmer could be held to be control of the could be The circumstances under further would they held to be criminally liable.

The circumstances under which this could arise are outlined in the latest issue of Computer Law and Tax Report, a newsletter published in Boston as an "intelligence service for computer users and their professional advisers."

Under the headline Can a Programming Error Create Criminal Liability? the author points to recent regulations

Confusion for users over which 290X op system will be used

THE good news for ICL 290X users is that a new operating system with integrated teleprocessing capabilities is on the way to see them into the 1980s.

The bad news is that a conroversy has arisen over which of two products, Ice or Supremoe is to be offered and, once again, the poor bewildered user left guessing.

There are four existing operating systems available on the 2903, 2904 and 2905. They are: Exec 1, which runs on all models; Exec 2, which runs on all but the cut-price models, Exec 3, which runs on the 2004/ 50 (CW, March 23, 1978): and Exec 5S, which runs on the 2905 (CW, April 26) and includes microcode assists for RPG II and

of the one below, and are based to the Exec used on the small 1900s Internally they are colleclively known by ICL as Emoe.

No one can deny the enormous success of the 290X line, which took ICL itself by surprise. It turned out to be the right product at the right time. and the success seems to vindi-

dominantly batch operating system, and the demand today is mainly for transaction processing. The 290X represents the same half-way house between the two as IBM's System 34 compared with System 34

dalabase applications.

ICL has long been aware of the need for something comparable and was given a grant by the Department of Industry to invest in deciding upon a new operating system.

One of the criticisms of ICL in the past was that, unlike IBM, its resources were so thin that it could only invest in one solution to a particular problem, and if the one chosen turned out to be a dead end, the company would be in trouble.

ICL is a big company now research and development budgets are a little fatter, and two alternative projects have been under way for some time to develop the appropriate operating system.

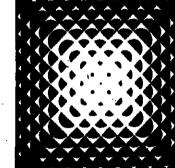
One, code-named Ice, Inte Communications ecutive, is completely new, the other, code-named Supremoe, is defined as a "design concept for the future of Exec" essentially major extensions of Exec to meet the future requirements of 290X users.

The controversy has been whipped up over the fact that now there are two apparently viable options open to ICL, one will have to be dropped.

It appears that the latter, Supremoe, is presently in the ascendancy and, remembering all the problems ICL had in getting VME/B and VME/K right, one can understand why. Whichever route is chosen,

users should be able to rely upon almost total compatibility with the existing Execs. If this proves not to be the case, ICL will put in leopardy all the potential future business of its coveted 290X user

# Britain's



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Terminating the printer

under Univac OS

OS operators should always stop the printer before cancelling sick output stage (Op Spot, June 28).

And now Alan Winter of BP Oil in Hemel Hempstead, gives single advice in relation to the Univac OS 1100 environment.

He comments, "Univoc operators, particularly trainess, should sin take care when cancelling a job which is in the process of being prints. Instead of Cancel, we use a "SM device E' keying where E stands to

operators use to control the printer: "SM device T", to terminate to device, and "SM device I", which stands for initiate, or start it.

device, and "Similative it, which status for limitate, or start it.
"Whatever the reason for terminating the printer, the operator set
take care to re-sligh the paper before re-initialising the device.
Otherwise, the next print-off will be mis-aligned."

**Ex-TOPS** students

# College prepares school leavers for job market

grows, more and more sites are having difficulty in finding experlenced and qualified staff.

To overcome this problem. many are now looking to recruit staff at junior level and fill the senior positions from within the

Colleges of further education have a big role to play in this context. In fact, the main aim of "vocational further education" is to prepare young school leavers for the job market. according to Angus Redpath of Anniesland College in Glasgow.

A senior lecturer, Redpath most operational duties as soon, writes, "The main computing course run at our college is the Scottish National Certificate in computer operations. It is a two weeks at one of the local one-year, full-time course and sites. leads to the examinations of the

The course is made up of five subjects operations, programming, data processing, computer theory and accounts

He goes on "While the course is primarily concerned with computer operations, we are aware that employers want staff at the junior or trainee level. who are not over-specialised in operations to the exclusion of all

So the students are trained up to junior operator level although, according to Redpath, they are capable of carrying out as they leave the college.

To gain practical experience of operations, they spend at least

efforts to extend it. The good relations we have built up with companies over the years have helped towards a clearer understanding of mutual needs and

Throughout the year, the students take part in collegebased projects which are intended to be of practical benefit.

"The main reason for their inclusion in the course is to knit together the aspects of computing dealt with under the various subject headings.

"This type of work has a direct bearing on their studies and helps to maintain a high level of interest and motivation during a very busy year."

Although the college does not have an in-house mainframe, its computing facilities are more Pet, data prep equipment, and links to a Prime 400 and a DECsystem-20.

"The net result is that the students are kept very busy from day one of the course. This is no soft option as an alternative to work."

Redpath says that the demand for the college's students is so great that about 90 per cent of them have positions in the industry before they have completed the course. He goes on, "Feedback indi-

cates that operations is not only a worthwhile career in itself but that the opportunities of moving into areas such as programming and analysis are good. The majority of the students graduate from their initial appoint-ments to higher posts within 18 months to two years."

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COMPUTER

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Borehamwood College in Herts. Steve, who works at Jermyn Industries' site in Sevenoaks. Kent, told me, "Two of our operations staff guve in their notice recently; one of them is a senior operator, and the position is to be filled from within the

Ward (Op Spot, July 7) has a

chance of moving up to the

eight months after completing

his operations course at

There are three candidates for the position, and the operations manager is to work with each of them, to find out who is best suited for promotion.

Dave Townsend, another ex-TOPS student whose progress we have been following, is

of them left and the come: has decided not to replace his "In addition, the workload increasing all the time -: much, in fact, that we plan install two new aschive ve

important, for an untidy are.

detrimental to efficiency i

makes operating a precan

point, staff should clean up.

they go along, returning

media to the appropriates

rack as soon as they a

longer required by the syste

Consider, for example, as.

of jobs which uses a lot of u.

some of which are needed

once per run, while others;

required several times.
As each job finishes, it

too easy for the operati

adopt a "put them awa,

minute" attitude. I have

that myself. But in the lough

such an approach make t task more difficult.

The operators should

find out which tapes are

taken to extremes.

An operator at the Fits

National Bank of Chicago is

London, Dave said, "I ge to a

everything, from running to systems to using the IBM with

programs. It suits me becaus!

earn more and don't get bord'

mainly to the fact that he

employed at a small site t.

ments have added to his duis

of five operators, two or a

and three on evenings, but 6

"Until recently we had a ter

Dave attributes the variety

## Tidiness is functionalnit-picking is not

puter room clean and tidy vary considerably from one installation to the next. At one site I visited, little

occupation. But it should not attention is paid to the matter, with the result that tapes, discs and boxes of stationery are kept on the computer room floor due mainly to a lack of storage facilities in the area and not the fault of the operators.

A rather different approach is used at another installation I know of. At the end of the night shift, the operators are expected

vacuum-cleaning printers and wiping print trains is fair enough, but at this site the operators are expected actually to remove the trains and open up the back of the units for

One bright morning the manager sauntered into the more than once and keeps by the console. The volumes should be relief. himself to inspect the units, one the tape racks as 500 pt. system has finished with of which he discovered was a bit dusty. He immediately seized on this and ordered the operators who had just completed a 12hour night shift - to clean all the printers again. (If ever an operators' union was needed, it

Regarding the maintering peripherals, it is imported they are cleaned regular order to prevent reading the provent reading the provent print quantity. errors and poor prial quality was needed on that occasion.) It is obvious that neither site puts the right emphasis on com-

By Martin Banks



MICRO NEWS

Meter reader

from UCSL Microsystems, seen here in the final stages of assembly at the company's Berkhamsted facility, is now being offered to gas and electricity authorities for meter

reading applications.

This is the market being investigated by Pleasey with a specially developed portable system (Micro News, April 26). UCSL estimates that the European market for such terminals could be as high as 25,000

in operation, each M50 would be loaded from an authority's central computer with all information necessary for the meter reader's "walk". The reader, at each reading point on the walk, enters the meter reading into the terminal's memory. At the end of the day, this data is read back into the central computer.

# AMD-Zilog race for Z8000 support

building up between Zilog and Advanced Micro Devices as to which will be the first with the most in supporting the Z8000, bit microprocessor.

Following the recent announcement by AMD of three new peripheral chips for the processor (Micro News, July 19), the company has announced a new development system that will not only emulate the Z8000 prior to its availability, but will also allow both hardware and software development on the Intel 8080 and 8085 processors, as well as the Zilog Z80, and the Z8000

as it becomes available.
To complement this, AMD is also planning to introduce a 28000 evaluation board which, in addition to operating in stand-alone mode, can also be plugged into the new development system. Both are expected to be available by the end of this

Zilog, for its part, has just introduced a single-board Z8000 development module, but a full development system is not expected until early next year. Its introduction, however, is likely to be followed later in the year by a general-purpose computer system, which is expected to employ a multiple processor

configuration.

The AMD development system, known as the System 8/8, in fact uses an 8080 processor chip. The minimum processor chip. The minimum configuration, costing £5,095, includes 32K bytes of RAM, dual floppy disc drive offering 512K bytes, one RS232 port and six parallel

The minimum software is an 8080 macro assembler and a Z8000 translator and macro assembler. This latter is currently suitable only for software development as it does not have sufficient operating speed to emulate properly a hardware configuration system. There is also a text editor, link-loader and disc operating system.

Options for the system include memory expansion, Z80 and 8085 CPU cards, in-circuit lation boards, and a hard disc system. Software options include Basic, Fortran, Pascal

#### £20 fee for Pet repairs

COMMODORE Pets are now being repaired for a flat fee of 120 plus the cost of parts, by Luton-based Pet distributor

The service is open to all Pet owners, not just those originally supplied by Isher-Woods.

It is hoped that an automatic test system based on a Pet microcomputer will be up and microcomputer will be up and ninning by this week.

and Cobol high-level languages, and macro assemblers for the optional CPUs. For AMD, however, the big

one is likely to come early next year with an upgrade of System 8/8, known as System 8/16. This will incorporate a Z8000 CPU board as standard. Its evaluation board, costing

about £700, will include two RS232 ports, 24 parallel 1/O lines, 8K bytes of RAM and 12K bytes of PROM/ROM space -2K bytes of which will be taken up by the monitor. Options for this will include an Ascii line assembler, and a keyboard and

20-character display.

Both Zilog and AMD state Both Zilog and AMD state
that samples of the Z8002

The Prime advantage over the AMD evaluation board is that it variant of the 16-bit processor

source agreement, to wait 90 days from Zilog's announcement of availability before releasing any parts. Zilog claims to have had samples available

The Zilog development module features a Z8002 processor, 2K words of monitor, 16K words of RAM, dual serial interfaces and 32 programmable 1/0 lines. It is capable of being used either as a hardware and software development unit, or being designed into a system configu-

#### Fairchild's figures leap

Camera and instrument has announced querterly financial results that include a 32% jump in sales and a doubling of profits over last year.

Second quarter sales were \$157,996,000, 32% up on the same quarter last year, and 15% up on the first quarter of this year. Profits, at \$12,562,000, were more than double those for the same quarter last

Figures for the first half of this year show the company with a rise in profits of 63%, to \$19,618,000, on sales that advanced by 28%, to \$313,847,000.

#### **Growing importance of** the 16-bit market

DESPITE the fact that the wider word size of 16-bit microprocessors offers designers little intrinsic advantage in the deveopment of microcomputer systems, these devices will assume considerable importance in the marketplace by 1983.

This is the primary finding of a Technique Inc of the US, and published in the latest issue of vicrocomputer Analysis.

The degree of the importance to the marketplace is estimated in the report as resulting in a 60% annual growth rate in sales of the devices over the next few years, with a share of the microprocessor business rising from 6% now to 23% by 1983.

One of the principal reasons cited by the report is that the 16-bit address bus of the popular 8-bit microprocessors is placing increasing capacity restrictions on system memory, it points to the fact that in the early Seventies, 64K bytes of memory seemed huge.
Now, it is a Megabyte of

memory that seems profligate for microcomputer systems. The that by the end of the lifetime of the new 16 bit processors now to this cha coming on to the market, a ola 68000.

Megabyte of memory will itself

The reason that these new 16-bit processors offer little advantage is that much of the processing work they will be used for is byte-oriented. The wider word size over the currently predominant 8-bit devices is cording to the report positive disadvantage.

This could lead to little improvement in throughput, for if most of the data can be fitted into bytes, half the memory space can become wasted, th wasted area being the highorder bits of the 16-bit word Certainly more efficient utilisation can be achieved by packing two bytes per word, but this needs the execution of sequential instructions to unpack the bytes on reading.

So, the report suggests, the higher processing speed of the 16-bit devices becomes cancelled out by the increased instruction processing overhead.

The report also presents ar analysis of the current and future crop of 16-bit processors, together with an empirically de rived chart of their relative power. Top of the pile, according to this chart, will be the Motor-

#### How to stop having to explain why the computer won't do everything the boss expects



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Typically, the operator will record information relating to lob cancellations and changes in

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#### PEOPLE AND EVENTS

# Major changes at **Digital Equipment**

have been announced at Digital Equipment, which include the annointment of UK sales, marketing and CSS managers, and CSS and engineering managers for Europe.

Former UK marketing in Stockholm. manager, Tony James has been promoted to sales manager in the UK. He has spent two years as marketing manager at the company's European headquarters in Geneva.

As sales manager, he succeeds Dave Buckingham who now be-comes manufacturing, distribution and control product manager for Europe.

Bill Passmore takes over from James as marketing manager. -His most recent position was that of central and south-west district manager for Digital. He joined the company in 1971, and was previously with Nuclear Enterprises and EMI Electronics. He is replaced by Frank

Manager for computer special systems in Europe is Kristoffer Sygel, who will be responsible for the four special systems groups in Reading, Munich, Paris and Stockholm. He was formerly CSS business manager

Stuart Haughton has become manager of the UK CSS group, based in Reading. His previous experience includes several years with the UK atomic en-

Formerly ESE manager in Reading, Jim Wade has been appointed European engineering manager, and will be responsible for engineering operations in Europe including product development management, product planning, safety standards and the European software engineering group already established in Reading Dick Davies assumes the role of



TRAINING manager of Redifon Computers, Peter Haddow, is seen here showing a memory board to children from Ifield School, Crawley, who attended a three-day Careers Exhibition at Crawley Technical College. Redifon was among 65 local firms at the exhibition, which was attended by over 3,500 schoolchildren. One of the main attractions for the children was the R850 terminal, which they all had the

Formerly director of Telecom- turnkey systems.

Terry Baxter has joined puting's system division, he will Euroco Computer Services as now be responsible for producsystems development manager. tion of all software products and

#### BIS prize for student

The BIS Applied Systems cash prize for the best final year roject at North Staffordshire olytechnic has been won by Mrs Diane Bishton. Hor project was antitled "The implementation of a natural language processor using compatible semantic derivations".

BIS said that Diane had shown "exceptional morit and effort" in developing her project, in which she produced programs which implemented principal strategies.

principal strategies.

Prizes were also ewarded to
Neil Taberner for practical programming and Michael Ames
for the best practical workshop. The awards are made to encou rage undergraduates in their ractical course work.

Daniel Weadock, formerly director of operations for ITT Africa and the Middle East, has become group executive for the same area. His predecessor, John Guilfoyle, has been appointed president of ITT Europe, Weadock will report directly to James Lester. executive vice-president and a member of the ITT office of the chief executive.

Brian Sear has become manager of venture development, a newly created position with GenRad. He will be involved in developing five-year strategic plans involving identification and creation of new business opportunities. He was previously vice-president and general manager of Fairchild's sentry systems division in



Third Rocky Mountain Symposium on interocomputers, IEE Computer Society, Pingree Park, Colorado, Contact Michael Tindall. Dept of Computer Science, Colorado State University, Fort Collins, CO

AUGUST 27-SEPTEMBER 2 Trade and technology in orbit. Orb Foundation. Wembley conference

SEPTEMBER 4-7 Compon Fall '79, IEEE Computer Society, Capital Hilton Hotel. Washington DC. Contact Compcon Fall '79, PO Box 639, Silver Spring, MD 20901.

The future of real time languages n process control, BCS Process Control specialist group. Reading University, Reading, 10,00.

SEPTEMBER 10 Database systems and informa-tion retrieval. BCS Information Retrieval group. Computer Laboratory, Cambridge University, Laboratory, Cambridge.

September 11 Performance management. IDPM West London and Oxford branch. Tesdata House, Hatfield Road, Slough. 18.30.
Bar-coding techniques in stock

Bar-coding techniques in stock control. IDPM, Hull Crest Hotel, Ferriby High Road, North Ferriby, Hull. 19.15. SEPTEMBER 11-12

Computing and communications in the 1980s. Martin Simpson Research Associates. Park Lane Hotel, 36 Central Park South, New York. SEPTEMBER 12-14

Shape recognition and artificial intelligence. AFTEC and IRIA. Toulouse, France.

Optimal control of large scale systems. IEE, Savoy Place, London WC2, 00.45. SEPTEMBER 17

An afternoon with James Martin.
IBM CUA and Butler Cox
Associates. The Grosvenor House
Hotel, Park Lane, London. SEPTEMBER 17-21

Computer science and law. Course, CREST and SRC. Swansea. University, Swansea. Tel: 0792 25678



Peter Chapman has become group manager for Fairchild; semiconductor division, when he will have special responsibility for microprocessor applications technology & joins the company from [7] Business Systems.

Keith Dumbleton has ben appointed managing directors Syace, the electronic system and components company le succeeds Roger Cooke, who remains as chairman of the company. Dumbleton joinel Syace as sales director after time in the industrial sales dission of Mullard.



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COMPUTER COURSES

TO encourage the growth of manufacturing industry in the Irish

of grants and tax relief. PAUL poration tax of 10% on profits until whiled a considerable package exports until 1990, a reduced corgrants on the cost of plant,

NORKETT here describes the ad- 2000, non-repayable grants for site Rapublic, the government has vantages, which include no tax on development and tax-deductible

# Tax advantages of running a business in the Irish Republic

THE economic advantages of running a business in the Irish Republic can be summarised in two words: tax and cash. The Irish government has put together a package of incentives that are very attractive.

The tax advantages are best for the manufacturing company with a high export ratio. As the Irish market, in population erms, is less than a third the size of London, manufacturers will almost certainly be exporters, therefore the incentives are in the right place.

For a company wishing to set up a factory in the Republic here will be no tax on export. profits until 1990 provided that the export investment commit ment is made before 1981. From January I, 1981 until December 2000 a reduced corporation tax of 10% will apply to all profits derived from manufacturing in

Existing manufacturers that are receiving fiscal advantages from the system of export sales relief will not be adversely affected by the introduction of the new 10% rate. The two schemes will run concurrently until 1990. After that date the 10% corporation tax rate will apply to all manufacturers in the

significantly more attractive land has double taxation agree- programmes for workers in new than UK incentives offered for some assisted areas. The Irish offer 100% first year allowances on the gross cost of plant. This is quite generous if a 50% grant was given - the UK usually deducts the grant from the allo-

The big incentive is cash grant towards the costs of site development purchase of fixed assets. these terms a few simple figures

may help to illustrate the point: suppose a company buys £100,000 of machinery and secures a 30% cash grant. In Ircland the £100,000 may be deducted from the first year's profits, whereas in most UK-assisted areas, if a 30% grant was obtained, only £70,000 would be deductible when calculating taxable profits.

Dividends paid to overseas corporate or individual shareholders will be fully

ments with many countries including the UK, the US and most abroad for training and for of the EEC. This means that in hiring training consultants. many instances profits repatriated from Ireland as dividends grants there are also facilities for will be either wholly or partially exempt from tax in the country

the costs of site development

company was considering a fac-tory in the western half of the

Republic, then up to 50% of the

fixed investment costs would be

In these matters the govern

For readers not familiar with

ment appears to be capable of acting quite quickly. For example, the DeLorean deal for manufacturing the DeLorean sports car was a £65 million investment package and was completed in 45 days. The deal included a significant subscription for government shares Once the factory has been set up there are additional grants

paid by the government.

available of up to 35% for the fixed costs of expansion and modernisation. There are also subsidies for in-house research and development programmes. The training grant is another useful benefit. Grants are paid exempt from Irish tax, and there

The capital allowances are not are no withholding taxes. Ire- towards the cost of training The town of Ballincollig in County Cork is the location of the Data 100

In addition to government raising capital through private and State-sponsored finance houses. The big incentive is the non-repayable cash grant towards

For exports, credit insurance covering commercial and political and

cal risks is provided by the and purchase of fixed assets. If a government. This enables export credit finance to be obtained from the banks at a proferential rate.

The financial and fiscal ad-

Dividends paid to overseas corporate or individual shareholders will be fully exempt from irish tax, and there are no withholding taxes.

vantages of setting up in the Republic of Ireland can be summarised in a simplified example. Assume that a minicomputer manufacturer has designed a product with proven market potential. To set up production the company needs 50,000

plant that builds most of the equipment sold by the company in Europe The main product is the Keybatch multi-terminal data entry system, one of which is seen here being checked out. The Irish plant was opened by Data 100 four years ago and now employs more than 160 people. Future products to be built there could include the Sycor line of Intelligent terminals, because Sycor's Canadian based parent, Northern Telecom, now also owns Data 100 (CW, December 7, 1978).

COMPUTER WEEKLY, August 9, 1979

square feet of light industrial space, £50,000 working capital and £500,000 fixed capital. It expects to employ about 50 people. Sales expectations are: year one, allowances and stock relief. £500,000; year two, £1 million; To make a simple comparison year three, £2 million, with a

if the company wants to set up in the UK, the two main prolems are finding the right loca-

tion and financing £500,000. There may be some difficulty in getting finance on realistic terms because of the financial institutions' apparent reluctance to back technology. However, assume finance is arranged at an average cost of 20% and factory space at £3 per square foot. Taking these simple figures calculations, the three-year aggregate after tax profit would be about £610,000. The main de-

US Department of Commerce stallatios for the period '74-77 show a 28% average on trust return on investment for US manufacturers located in the Republic of Ireland - more than twice the European average.

IDA Ireland The Hish government's Industrial development agency has offices in London at 56 Davies St., London W1Y 1LB. Telephone 01-629 5941.

Mådrid, New York, Chicago, Los Angeles, Houston, Tolonio. Sydney and Tokyo

duction is the cost of finance. There would be little UK tax payable in the first two or three vears because of the capita

for the same set-up in Southern constant 30% before tax net Ireland requires a broad-brush approach on comparability of

Assuming the sales forecast and production capability would be the same as in the UK, the after-tax profits would be higher. The difference arises from investment grants, cost o factory space, and finance. If a 30% grant was allowed on the fixed investment and balancing finance obtained at 12% with factory space at £1.50, the three-year aggregate after-tax profit would be £1,229,000.

The tax advantages would





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# INTRODUCTION TO PASCAL Use of booleans and state variables

THIS article introduces the use of booleans and state variables in

#### Recap, and on to checks

In Part 5 of this series, the outer shell of a Timechecker program was discussed. The main step in the program was a call to a procedure to input times for one employee for one day. Last week we looked at the details of inputting these times. Now, like any good programmer, we must complete the input procedure by checking the times for inconsistencies such as signing off before signing on or having different days for the times. (Blaze Inc. does not have shift working yet.) The full list of checks is:

#### All days are the same. The mornings-on time is after the gates open at 7.30 am and

the afternoon-off time is before they close at 6.30 pm. 3. Both "off" times are after their respective "on" times.

4. The time taken for lunch is at least the required 30 minutes. if any of these gives a negative result, the error routine is called, which, on return, positions us at the start of the next check. The question is whether it is meaningful to do subsequent checks if one has failed. In the last case, the answer is No. If the employee muddled up the on-off times (check 3), it is more than likely that the lunchtime check will fail. This could give a false picture, since muddles can be sorted out easily but a lunch error must be reported to the Personnel Officer. As a result, the fourth check should by omitted if the third failed. Of course, we want to do this without repeating the question and therefore need to preserve the unswer somehow for future reference. For this, we need a boolean.

#### What is a boolean?

A boolean is a type of variable which is better known as a logical (in Fortran) or a flag. It takes a value that is either true or lse. True and false are also the results of conditions which we use freely in IF statements. Thus we can say that the expression

#### IF expression THEN . . .

must return a boolean value. Boolean variables come into play when we need to preserve this condition for future reference, as in the case discussed above.

In general, assume that the states of all four checks should be preserved. So we declare four boolean variables.

VAR dayerror, gateerror, inouterror,

funcherror: boolean: A day error would be established by looping through the four times and throwing out any one that does not conform.

today : = times[inmorning]. day;

dayerror : = false; FOR session := succ(inmorning) TO outafternoon DO

daverror := day error OR

(times[session].day<. >today);

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This little snippet illustrates that loops can count over symbolic values as well as numbers. The succ function gives the successor; succ(inmorning) is therefore identical to outmorning. Dayerror will remain false if no day is out of line. Now we can say at many points in the program

IF dayerror THEN error(4) without repeating the lengthy question.

#### Boolean and other functions

Moving on to the gate error check, we see that it entails finding out whether times[inmorning] (which is a record of three fields) comes before gateopen, which is set up as follows:

VAR gateopen : time; WITH gateopen DO

day := today; hour := 7; min := 30

While it is sensible to define equality of records (ie time! = time2), ordering depends on the meaning of the fields and cannot be established simply by using an operator like < (less than). We must enhance the language by defining our own "operators" to work on times. These are called functions, and can be used as

gaterror := timecompare (times[inmorning], before, gateopen) OR timecompare (times[outafternoon], after, gateclose);

Timecompare is a function which takes three parameters - a time, a relation, and another time, and returns a boolean value, true or false. Its Pascal declaration is:

FUNCTION timecompare (ti: time; r: relation; t2 : time) : boolean:

What are relations? Here we make use of symbolic values again, coming up with

TYPE relation = (before, beforeorequal, after, afterorequal); which is far safer and more readable than defining codes for them (eg 1 means before, 3 means after etc.)

Inouterror will use timecompare in the same way and once established, we can conditionally perform the last check le IF NOT inouterror THEN

uncherror:= minsbetween (time[outmorning], times[inafternoon]) < lunchtime:

Here there is another function, this time one that returns a value in minutes which is compared, using the built-in lessthan, with lunchtime, which is also in minutes. The minsbetween declara-

FUNCTION minsbetween (t1.t2: time): minutes;

#### Inside timecompare

The above declarations set out what the functions do bu obviously it is necessary to define how they do it as well. Take timecompare: it is given two times and must see if they conform to the specified relation. A nest way to do this is to set up two

#### VAR less, equal: boolean:

and consider each of the fields of tl and t2 in turn, setting the states of less and equal appropriately. Thus

less := tl.day < t2. day;equal := t.1day = t2, day; less := less OR (equal AND t1. hour < t2. hour); equal; = equal AND(t1: hour = t2: hour); less: = less OR (equal AND t1: min < t2: min)); equal : = equal AND (tl.in = 2t.min);

#### state := searching; KEPEAL

IF sof THEN state := notthere ELSE IF employee = leaver THEN state := found; UNTIL state searching;

' Now do different things for the two exit conditions') **CASE state OF** 

found: (" Calculate salary, leave and pension due") notthere : (' Issue an error mestage '

Figure 1. Search for an employee who wants to leave.

#### COURSES

EUROMICRO, the European Association for microprocessing and microprogramming, is organising its aixth annual symposium, called Euromicro 80. This will be held in London, and workers in the fields of microprocessing and microprogramming are expected to exchange ideas on the latest developments. The structure of the programme will consist of three sessions, schenlift, industrial and short notes sessions, allowing for brief, up-to-dute preschations of results and applications. The cohference will take place from September 18-18, and those wishing to submit microprocessing and microprograming, is organising its sixth annual symdum, called Euromicro 80. This will be id in London, and workers in the fields microprocessing and microprograming are expected to exchange ideas on the latest developments. The structure of ne programme will consist of three sessions, scientific, industrial and short notes sessions, allowing for brief, up-to-dute presentations of results and applications. The conference will take place from September 18-18, and those wishing to submit papers, should, send an abstract before

May I, 1980, to the Programme Chairman, Mariagiovanna Sami, let di Elettronica. Politecnico, Piazza L. Da Vinci 32, 1-20133



#### by Dr Judy Bishop

suffer from the basic restriction of only reflec-ting two states, says Dr Judy Bishop, in the seventh part of her 10. part series.

A lecturer in computer science at Witwatersrand University in South Africa, Dr Bishop first became acquainted with Pascal when she was studying for her PhD at Southampton University

While this may look a bit complicated, it is certainly easierly the equivalent IF statements. (Cobol programmers try it out) Having established these two states, we then use the CAS statement, which proved so useful in the previous article, is design the correct value to time-compare.

CASE r OF timecompare := less: beforeorequal : timecompare : = less OR equal; timecompare := NOT less: afterorequal : timecompare : = equal OR NOT less:

All in all, the boolean variables have saved us from writing les and lines of conditions and IF statements.

#### When two is too few

Booleans are great, but suffer from the basic restriction of out reflecting two states. One of the most common algorithms or computing — that of searching a list, file or array for a specify element - requires at least three states, namely:

1. The element has been found.

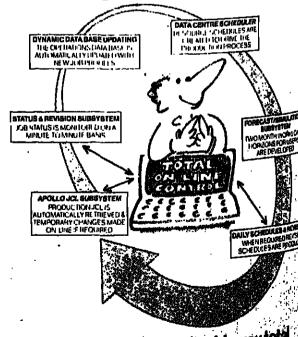
2. Still searching.
3. The end of the list has been reached without finding the No problem. Booleans are, after all, just a special kind d

TYPE boolean = (false, true).

We can therefore go ahead and declare VAR state : (searching, found, notthere);

The portion of program to do the search is given in Figure 1. Part 8: Dynamic people — creating space if runtime and the use of pointers.

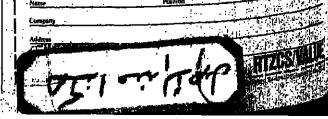
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RTZCS/VALUE 103 Jermyn Street, RTZCS Sårphatistroat 30, 1018 GLAMEN London SWIY 6F.B. Rel: (01) 930 4163 The Netherlands. Tel: (020) 263979 (1018) VALUE SYSTEMS FOR COMPUTER OPERATIONS



#### systems take off with the PTS 6000 banking ter-COMPUTERS minal system, which first made its mark in the local authority market rather than the banking and sayings sector, Philips' terminal systems business is begin-ning to take off in the UK.

Philips' terminal

the year (CW, January 25) and at the offerings of European UK if there proves to be a need the year (CW, January 25) and suppliers.

UK if there proves to be a need for it the P8000. This is a lower

the real breakthrough came suppliers.
with the order from the Halifax The impending acquisition of with the order from the Halifax Bullding Society, the world's the Four Phase Systems marlargest The initial order is worth keting company in the UK, exhardware of the PTS 6000, and well over £10 million and covers clusively reported in Computer able to use all the communicative society's existing 400 Weekly (July 26) will lead to a tions software developed for the broadening of what Philips Data banking product. However, the society is Systems calls its subsystems The subsystems division now opening new branches at a rate division.

The first building society customer, the Midshires, opted for PTS 6000s at the beginning of

branches (CW, July 12).

May 4, 1977).

feasibility of EFTS (CW, October 19, 1978).

The feasibility study will

focus on a particular town,

possibly a seaport, since most

people in such a town both live and work there. The chosen

town will not necessarily be

the one adopted for any pilot experiment which may follow

After examining the ter-

minals now on the market, the project team has concluded

that no equipment which

would meet the full require-

ments of an EFTS retail system

are looking at something much

tem currently running in one

small town in France. Ulti-

mately they envisage a large proportion of retail and service

nore ambitious than the sys-

opening new branches at a rate of 40 a year, and the business that this will generate, together with the likelihood that the 2½-year UK history, and the business computers. But of all Halifax will implement a cash dispenser network, makes the long-term potential of the contract enormous.

The dispenser network, makes the long-term potential of the contract enormous.

The dispenser network, makes the at is the one currently supplied building society and banking markets look the most exciting, system suppliers, all of which with forecasters anticipating. A third building society is ex- have diversified their product enormous demand for online pected to announce shortly that lines to provide substantial local customer-operated cash dis it has chosen the Philips system, processing capability on what is pensers and transaction ter while the company has com-still primarily a data entry sysminals. while the company has com-

pleted delivery of equipment It puts an annual £40 million is that most of the cash dispenunder the £2 million contract value on this market, which it sing mechanisms come from with Scottish Trustee Savings Banks, and looks for additional identifies as being supplied by 10 either Chubb or De la Rue of the business from that quarter (CW, companies. In descending order UK. The Philips PTS 6600 uses of market share, they are the Chubb mechanism. Philips claims that it has 40% Redifon, Ventek, Data 100, Four Phase reports from of the local authority market for CMC, Computer Automation, Cupertino, California that in its cash receipting systems with the PTS 6000, the other major sup-GEC Computers, Data Logic, second quarter, ending June 30,

Inforex, MDS and ICL. It is aiming to win 10% of this million on turnover up 20% at pliers being ICL, Datasaab and Olivetti. market with the Four Phase \$40.3 million. Turnover for the It also sees signs that the Big system, which is being renamed past four quarters was \$80.2 Rive clearing banks are begin the P7000. It is built around a million. The agreement under Five clearing banks are beginning to slacken their ties to their powerful 24-bit processor which which Philips markets Four traditional US suppliers, princan support up to 32 terminals. Phase products in Europe has cipally IBM, Burroughs and Cobol programming and a word been extended to December

Pilot scheme likely result of study into EFTS for shoppers

THE feasibility study on an Electronic Funds Transfer sysoutlets being equipped with tem for UK shoppers should be customers' magnetic stripe completed later this year, after which the major clearing cards and doing a direct debit on an account held at any of banks will decide whether to the 11 banks and two credit go ahead with a pilot project. card companies which have The study was initiated folcommissioned the study. lowing a working party report which established the

In the French Alps town of Bourg-en-Bresse, merchants, including super3608 direct debit terminals, online to the Banque Regionale de l'Ain's IBM 370/138 mainframe (CWI, March 15). The experiment is reported

Communications emulations

for the local authority market

have been done for attachmen

to Honeywell, IBM, Burroughs

ICL and Univac mainframes in

the UK, so Philips Data Systems

is confident of its skills in this

A third terminal systems pro

duct will be introduced in the

level line of general purpose ter-

forms one arm of Philips Data

net profits were up 38% at \$3.9

to be a great success - except in the dress shops, where women have been reluctant to use their cards. The bank suspects that women do not want their husbands to know how much

nominated.

Third order

#### Easier transfer of funds USERS of ICL 2900, 290X and on magnetic tape, and the

BACSTER program can not 1900 computers who want to transfer money through only handle and translate data Bankers' Automated Clearing in any format from tape or disc, but can also search up to 100 files for the data and select the Services, BACS, can do so much more simply with a new ICL tape-formatting program called BACSTER.

currently exists.
If the go-ahead is given for a pliot project, it could not get under way before 1982-83 at the earliest. The British banks are looking the could be set to be BACS provides a direct debiting and crediting service to customers of the five biggest clearing banks in the UK, using ICL 2960 and 1904S computers and greatly reduces the "float" in the system, since it provides same day clearing of credits and debits instead of the usual

three-day period.

BACS requires that data is and will handle foreign exprovided in a specified format change data capture.

#### Terminals will replace bank clerks'—report Prices for the terminals will

YOUR friendly neighbourhood bank clerk is on the way out, certainly in the US, and probably in Europe also, according to a new report\* from Frost and Sullivan on data comfor two British companies, De la Rue and Chubb, which make nunications in banking.
Automatic teller terminals the cash dispensing mechanisms used in many of the operated by the customer will automatic terminals offered.

be the biggest sellers in terms of value of the three types of fall from an average \$30,000 terminal widely used in branch banks — and that is good news

appropriate records. Up to 29 different accounts can also be

TANDEM Computers, manu-

facturer of the high reliability Tandem 16 minicomputer sys-

tem, has won a third order from

Barclays Bank. The machine on

order will have three processors

per unit today, to \$20,000 by

Data Communications in Branch Banking, Frost and Sullivan Ltd, 104-112 Marylebone Laris, London WIM 5FU, Telephone 01-485 8377,

#### Micro-based translator

A LANGUAGE training school in Aldershot is so convinced of the A LANGUAGE training school in Aldershot is so convinced of the value of microprocessor-based pocket translators that it is supplying each of its students with one as part of the course material. The machine is the US-made Craig M100, pictured right, which is claimed to be able to translate phrases as well as single words. Different languages can be provided by exchanging a ROM (pictured left).

Lou Fearnley, principal of the Cargate Language Centre, describes these machines as "only a start."

"Soon," he says, "electronic translators with large vocabularies, syntax and idlom capabilities will become widely used in the business community, where traditional methods have not proved wholly

# 'Personal' trade association call

association to look after its interests? In the view of Paul Rayner, new manager of the Computer Workshop store in Leeds, it does. Rayner is writing to about 100

companies operating in the field And the good news about that in the UK, suggesting that a trade association be formed. He says that though more and aware of the importance and

> that is raised on the subject consistently is that of trade union leader Clive Jenkins. Rayner points out that he does

A COURSE on computer science and law, with particular emphasis

on how computers can be used to extract the meaning from legal documents, is to be held in

Swanses in September.
Almed at computer scientists,
the course lasts eight days and
will be restricted to about 80

participants. Some places will also be available for lawyers and legal research workers who have a knowledge of computing. The course director is Profes-

sor Bryan Niblett, of University College, Swanses, and other lec-turers will include Layman Allen from the US, Thomas Barthel,

from West Germany, and Norman Numn-Price, of the UK.

Also lecturing will be Ronald Stamper, of LSE, whose Legal

should prove a key source of

information for anyone con-

cerned with marketing has been published in conjunction with

the Institute of Marketing. It is

which contains details of a wide

range of companies and services

which aim to get news of pro-

ducts to the right people in the

Most aspects of marketing are

covered in the extensive direc-

tories which list advertising

agencies, poster companies, direct mail and house-to-house

deliveries, newspapers and trade and technical journals, radio and TV companies, and trade

There are also sections on the

work and services of the in-

stitute of Marketing and on

education and training facilities.

to note the organisers of exhibi-

right markets.

associations.

the Marketing Yearbook 1979\*

**Marketing Yearbook** 

not necessarily disagree with what Jenkins has said, but he feels strongly that the industry involved in manufacturing and selling the systems needs a coherent and unified voice. 'After all," he says, "we may all be small companies, but cumulatively we are probably as big as ICL.'

the main exhibitions. At other times, a committee would look after the association's affairs. impact of microelectronics and microcomputers, the only voice Rayner can be contacted during working hours at Com-puter Workshop Leeds, West Park, Leeds, LS16 5LQ.

emailse legal and other rules in

machine-processable form. Professor Niblett sees a strong

possibility that developments is

program semantics, such as

Legal, will help in the drafting and interpretation of legislation.

At the same time, the accumu

lated experience embodied in sophisticated legal systems may well provide insights for the de-signer of computer programs.

A limited number of scholar

the course, which is backed both

by the EEC and the SRC. Further

Grant, Department of Computer Science, University College, Singleton Park, Swanses. Tel: 0792 26678 ext 502.

Marketing people will find

this a useful buy at £9.95 in soft

covers, or £12.95 case-bound,

\*Coples may be had from Marketing

including post and packing.

Basic packages

High Road, London N2 9PJ.

detalls are available from Dr P. W.

Extracting the meaning from

legal papers is aim of course

#### Major share CLEANING up in France, Data He visualises perhaps four Maintenance of Norwood, Lonmeetings a year, coinciding with

(CW, May 3).

don, has acquired an unquantified "major share" in Disclean Services of Paris. Both comnanies specialise in on-site disc

#### Contract with off

HONEYWELL has signed a long-term contract with Storage Technology Corp under which STC will supply Honeywell with tape drives on an OEM basis.

#### Honeywell switch

FIVE years of settled future development and better throughput are two of the main reasons why the Bournemouth and District Water Company says it has switched from an IBM System 3 to a Honeywell Level 62 system. Main applications on the £113,000 machine will include metered and unmetered billing, share and asset registers and an integrated accounting system. Processing facilities will also be provided to the nearby West Hampshire Water Company.

#### Patent au ne

ADVICE to employees on how to patent their inventions and make sure they do not lose their rights in them to their firms is the subject of a pamphlet published by AUEW-TASS, the technical staff union. The ramifications of the 1977 Patents Act are explained, particularly the statutory rights now given to recognised unions to negotiate compensation payments for inventions used by

#### Switch to NCR

A SET of accounting packages written in Business Basic for the NOW with almost 100 retail complete range of Data General outlets, the Home Charm group machines is being marketed by has decided to replace its Gross Computerplan, of Hounslow, Middlesex. Including payroll, mechanical registers with 150 NCR 2140 point of sale tergeneral, purchase and sales minals. They will be installed at ledger packages, the software is minals. They will be installed at available both to end-users and the group's Texas Homecare to software houses and OEMs. centres.

#### Two views on 'literacy'

GRADUATE business schools in The book consists of over 360 the US increasingly require their A4 pages and could be made a little more manageable if the list students to take courses in of fairs and exhibitions were computing, either for a basic eliminated. It would be far better tions and the areas they cover, or to give more prominence to Item 6 in the Sources of Infor-

our MBAs be able to demonstrate a working knowledge of advanced computer programming." Harvard Business School, on

grasp of computer "literacy" or Harvard Business School, on for still higher proficiency, the other hand sees no need for Wharton School at the Univer courses on the details of comsity of Pennsylvania says. "We puter technology, which is feel it's absolutely critical that, changing all the time anyway.

headquartered in Brentford

erly embraced the control activities as well as being a holding company for the computer business, now becomes only a hol-

#### **Burroughs** booms

BUSINESS is booming at Burroughs, with half-year net profit up 22% at \$111 million on turnover up 16% at \$1,277 million. Sales were the dominant revenue generator, up 19% compared with the same period last year, while rental and service business rose 13%. Orders in hand worldwide stood at a record level at the end of June.

#### Cheaper Flexiease

ATLANTIC Computer Leasing has announced price reductions on its three and four year Flexleuse packages for new and used IBM 303X systems. The charges for a three year Flexicase are down by 10.5%, while the cuts on four year leases are down by either 5.5% or 4.5% depending on whether the Flexieuse allows the customer to upgrade his machine after three or four

#### Tymshare profits

TYMSHARE, the big US based time sharing bureau, has announced that its turnover in 1978 was \$149.6 million, 47% up on 1977. Pre-tax profits came to \$19.4 million in 1978, a 23% increase on the previous year. The company's UK subsidiary chalked up sales of £1.2 million and pre-lax profits of £105,000 in 1978 compared with £625,000 and £41,000 in 1977.

#### Tape subsystem

DIGITAL Equipment PDP-11 computers based on the Unibus cun now use a tape subsystem from DEC that provides 1600 bps phase encoded recording and read/write speeds of 45 inches ner second. Called the TS11. the system includes a microprocessor-based formatter/controller and costs £8,708 and £9,686, for rack and cabinet mounted versions res-

#### Printer price cut

PRICES of the AJ860 and matrix printer terminal from Anderson Jacobson have been reduced by up to £200. The 60 chas version now costs £1.745, while the 120 chps model is now priced at £1,945. One reason for the cuts, according to AJ, is the strengthening of the pound in

#### Bus cards go IBM

WITH the number of pussengers buying the cheap rate Travelcards for bus and transport increasing at the rate of 150,000 a vear, the West Midlands Passenger Transport Executive has decided to install an IBM Series I system to handle applications and issue embossed

#### First sales

MSA's general ledger system is being installed by Sun Alliance insurance Group in one of the first sales to be reported by the company since its UK launch (Software File, March 22). Valued at £23,000, the software will run on an IBM 303X and replaces a manual system.

# Honeywell UK A writer's style THE UK operations of Honeywell have been restructured into two subsidiaries under a holding company. The existing Honeywell Information Systems, continues unchanged, but the four control divisions have been formed into a second subsidiary, Honeywell Control Systems, headquartered in Bracknell. Honeywell Ltd. which formby Andrew Morton

write Hamlet? Were the Casket letters written by Mary Queen of

To students of literature and of history these are three separate questions, but to a scientist they are three examples of a single problem for which a general solution is required, the problem of recognising a person from his written or spoken

The descriptive science which enables this to be done is called

As a recognition system stylometry shares the characeristics of all such systems and in its development it offers many parallels to the evolution of similar systems. The best known recognition system is that used by police forces for the identification of criminals.

As the 19th century pro-

gressed, cities, crime and police forces all grew larger. A pressing which an officer could recognise a criminal from a description. The Paris police led in the creation of a filing system but as allthe entries were made under names and the criminals used aliases no criminal had ever been recognised from a description. The descriptions were portraits paries, the kind of thing which might be found in a letter, eg "the criminal is a young lady of slender build, well-dressed and well-spoken, of good manners and education."

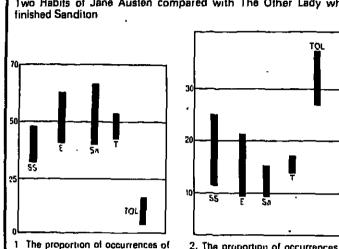
For any serious use this kind of description is hopeless. There is too little informution, it is in too few categories which are both ill-defined and variable and

Shakespeare

IT FB IS

IT FWS

Two Habits of Jane Austen compared with The Other Lady who



2. The proportion of occurrences of an io occurrences of both a and an. uch which are followed by a.

SS is a sample from Sense and Sensibility, E one from Emma, Sa from Sanditon as written by Miss Austen. T a combined sample from the three; TOL is the work of The Other Lady

natural and to deliberate altera-

It was supposed that an advance was made when the same information was translated into figures, so that the suspect becomes a female, 62 inches tall, weight about 105 lbs, aged around 25 years and having long dark hair. This is a little better but it is still not good enough to enable identity to be established with any precision.

The third stage arrives when someone asks the right question. If you want to identify one person out of a few billion, using the information is subject to characteristics which are easy to

fletcher

The division of the play Henry VIII between Shakespeare and Fletcher.

his is a simplified cumsum chart of two habits, how often it is immediately

ollowed by is and how offen it stands as the first word of sentences. The

average for Shakespeare, taken from Julius Caesar. Titus Andronicus and Pericles, is horizontal. The average for the Shakespearean scenes of Henry

VIII is very near to horizontal, the average for Fletcher is much higher and so

the chart climbs to the right. The scenes are in text order as taken from the two

classify, to record and to compare, characteristics that can be altered or concealed only with great difficulty, what kind of nformation will tell you what you want to know?

The first successful system was that of Bertillon whose father was professor of anthropology in Paris. The sonknew that a lot of information lay concealed in skeletons and so based his system on a few physical measurements, eg the circumference of the head, the distance from elbow to finger-

He made the first identification by matching records. However, his system was not really practical, since it relied on precision measurements being made as a matter of routine by untutored clerks on unwilling subjects, it was overtaken by the development of finger prin-ting, the first of a family of systems based upon biological

The introduction of all scientific recognition systems is resisted. It was pointed out that fingerprints are an affront to common sense that from fingerprints no officer could recognise his own wife or children, and though it might seem to work, no advocate of the system could explain why it did work. It was more than 100 years after their introduction that the molecular biologists were to do

The first step towards a recognition system for literary studies is that of stylistic description. In many ways this is the most lively stage, for everyone can use his own criteria to support conclusions

congenial to him. But as they continue, stylistic studies, reveal two fatal defects. The first is often expressed by the scholars themselves who will claim to be able to recognise any writer by his style but also be able to so alter their own style that recognition is impossible. The other difficulty is the accumulation of catastrophic failures by which students of style are

continually embarrassed. A recent example was reported in the Guardian: the critics of both the New Review and the Times Literary Supplement had given opinions that an

imitation of Cleland was rather poor, fulling to notice that included in it were passages, one of 300 words, lifted from Cleland.

The next step is to introduce some statistics into the stylistic description. This comes from an appreciation that a complete description of a writer will not only tell you which habits he has but how often he employs them. But as long as the figures only ornament a subjective opinion the result is no better than the purely qualitative description.

three essential principles. The first is that it is a science even if you are interested only in a single problem the method must be validated on a range of texts and writers before it can be

ipplied to a particular case.

The second principle is that stylometry must be statistical. Writers do not repeat themselves, rather they resemble themselves. This means that while it would be nonsensical to say that ten pages of Dickens will have 50 occurrences of AND, it might make very good sense to say that ten pages of Dickens will contain, on the average, 50 occurrences. Habits vary around average levels and so comparisons must be made by

The third principle of counts, but for anything men stylometry is that as all writers in any language have so much in common - the language in which they write, the rules and conventions of its use, the social, cultural and historical background of their lives - the best - certain texts where the uncerdiscriminators are not the few idiosyn**c**rasies which they might share with few other writers, but the different rates at which they use habits common to all

This is clearly seen in the choice of words on which stylometry is based. As our choice of word is affected by subject matter, by mood, by recent experience, by a host of factors, it follows that the only safe foundation for stylometry is supplied by the words which we must use for any subject, in every mood and on all occasions. These are the words aptly called, by the Americans, the filler words, the frequent connectives which form the skeleton which

supports the text. Although the high rate of irrence of these filler words is their most striking characteristic, it is not the most useful one, that distinction belonging to their frequency of occurrence in certain positions.

Position is relative, the sequence within sentences, lst. 2nd, 3rd word and so on, can be measured; the occurrence of a word before or after another word, the mark word, can be recorded; or its occurrence in the intervals between successive occurrences of other words.

Different conventions are suited to different circumstances and the large number of possibly useful measurements. together with the necessity of examining these over a range of writers and texts mean that a computer is essential in stylometric studies. It is possible to apply a known result to a limited case by using hand

Public interest in computering linguistics was first arouse when it was shown that evidence for the authoralipe literary texts could be drawn from the study of an author. ndividual usage — stylometr This is now finding a much wider range of applications, for Stylometry begins when it is instance in the legal field for understood that the subject has the verification of wills, and of

police statements Andrew Morton himsel created a legal precedent in 1974 with his evidence that only seven of 11 police matments submitted in a case had been written by the defendan who was then acquitted.

150

Andrew Morton is caming Out literary research in the Di partment of Computer Science of the University of Edinburgh, using EMACS, the Edinburgh Wulti-Access System. He is also a minister of the Churchel Scotland. He is the where Literary Detection, 111 W. £10.50, published by Book! Publishing Co of Epping.

extensive the machine must

It is not possible even! suggest the range of applications of stylometry, Elizabeth. literature has a number of vatainty derives from the lack historical information; Victoria literature abounds with anonmous publications where the anonymity is a condition imposed by the publisher.

But when deliberate concerments are taken into account the applications range from police statements, wills and other legal documents to impositions made by medium claiming not to represent but to be another person.

No one will claim the stylometry will answer all quit tions about the authorship and integrity of literary lexis but is will solve a great number of current problems and allos attention to move to me important matters.

In a short general survey of this kind it is vide any detailed illustra but two diagrams show to applications. The first is monstrate the difference ween Jane Austen and the Lady who completed in 1961.
the novel which had lain using the since Miss Austen's death. In literary terms the imitation quite good but the probability that 4,000 words of the Other Land Lady would be taken as lat Austen is less than one in the thousand million.

The second illustration is The second illustration of second illustration of second illustration of second illustration of second in the second illustration of second in the second in Despite having to draw on its substancial reserves as a result of the cesses, notably with British Airways, current swing towards leasing by users the Italian government and several big of IBM computers and IBM compatible rs. Amdahl Corp still appears n have the most secure future of all the firms in the growing line-up of software compatible machine manufacturers.

Over the last two years Amdahi has been actively marketing its 470 series in

The company's position in Europe has been further consolidated with the establishment of an assembly plant in ireland and an agreement with the French Thomson group under which

achieved some impressive sales suc- for Amdahl machines built in Ireland Amdahl Corp at Sunnyvale, California, a (CW, May 3).

Amdahi must also have been encou-

**KEITH JONES of Computer Weekly** visited the world headquarters of

and we need the best IBM

keting and software personnel from IBM but on the engineering

side we are now trying to bring

in college graduates rather than

taking engineers from IBM's big systems development centre at

maximum use of its precious

workforce, O'Connell explained,

"Our systems engineers are also

oughkeepsie."

'We get most of our mar-

few weeks ago and talked to two of the raged by the report published earlier O'Connell, senior vice president corpothis year by New York stockbrokers rate marketing, the man in charge of the Paine Webber Mitchell Hutchins (CW, May 10), which predicted that it tions, and Dr Andy Wang, director of would have cornered 20% of the market for large scale mainframes by 1983. IBM in the area of hardware perfor-

maintenance in the field and

they can take care of about 90%

handled locally using an inbuilt

and which generates printout

for the local maintenance staff.

'the problems that arise."



engineers at the remote instal

Not surprisingly, Amdahl Diagnostics are normally Corp is tight-lipped about pre-cisely what form the forthcoming H series will take, stantly monitors the perforalthough one hardware inmance of the Amdahl machine gredient of H series configurations looks like being the 3880 disc controller announced with

the 4300 line earlier this year. O'Connell revealed, "We have If they are unable to fix the fault Highlighting one way in rapidly they connect the mini which Amdahi tries to make online to an Amdahi Diagnostic ordered a bunch of 3880s to see Assistance Centre, Amdac, how they affect the channels on our machines and we are where expert engineers check the diagnostic information and growth as a company can only trained to handle hardware phone instructions back to the

# Amdahl looks to a secure future

with customers in Europe than

in the US, because they plan a

Asked about the competition

from IBM continually faced by

Amdahl, O'Connell commented

"We need to build up a solid

customer base before the IBM H

announce prices. IBM can also

make a lot of mistakes. We can-

"Our biggest problem is

finding the right people. Our

not afford to make one.

long time ahead.'

moving into Europe. IBM had already announced the 3033, and a lot of potential customers for Amdahl machines had signed letters of intent for the IBM sys-

This frank statement was made by Bill O'Conneil in a discussion about Amdahl's European marketing strategy. Despite this view, O'Connell is

certainly not unhappy with Amdahi's performance in most parts of Europe, and he believes that the company is now taking off in West Germany, which has been the least successful major European market for Amdahl until now. The firm has, however, won two of its first European orders there — from the German space research organisation, DRVLR, and the

Max Planck Institute in Munich. O'Connell continued, "After we sold those two machines in West Germany at the end of

have several commercial customers there, including Ford, Mercedes and savings banks in Munich and Nuremburg. By the end of the year we hope to have more machines installed in Germany than in the UK, even though Peter Williams, the managing director of Amdahi UK, has bet me we won't.

series arrives. One big problem for us is that IBM can forward "We got our salesforce organised quickest in the UK and Peter Williams is a great asset. We should have about 18 machines installed in the UK by the end of the year."

Orders announced so far by Amdahl in the UK include four machines from British Airways and one each from BOC Datasoive, Kays of Worcester, Chrysler, BL Cars, Ford, Rolls-Royce and Massey-Ferguson. O'Connell explained, "We

have been very successful in selling to manufacturing companies in Europe because they 1976 there was a gap. The main reason was the toughness of vendors. But there is no doubt are used to buying from two

# No dramatic change in technology

ACCORDING to Andy Wang Amdahl Corp is currently work have to be discreet to each of have to be discreet to each of ing on integrated circuit technology for machines two generations in the future, but the company is not going to make any dramatic change in technology for some considerable time at least.

He explained, "Bipolar techlology will be king here at Amdahl for a long time. The next two generations of machines will continue to employ emitter-



will be king here for a long time." coupled logic, probably current mode logic."

Working closely with Amdahl on these future developments are two major collaborators -Motorola, and one of Amdahl's big minority shareholders, Asked how secure Amdahl's

relationship was with these two-organisations, Wang commented, "We have an ironclad agreement with both Motorola and Fujitsu to stop them selling the devices we ally develop with them to computer manufacturers. We deal separately with

them about what the other is doing, but both of them trust us.

"With Fujitsu we have a joint effort in new semiconductor technology, which is a continuation of an agreement first signed in 1972." Amdahi's relationship with

Motorola is that of customer and supplier. Motorola's plant at Phoenix, Arizona, now being the principal source of Amdahl's ECL logic chips. Motorola used to second-source parts made for Amdahl by Advanced Micro. Systems before AMS left the bipolar business in the mid-

Amdahi has agreed with Fujitsu to use the Japanese firm as its principal source of custom LSI components for the next generation of Amdahi com-Asked whether Amdahl was

taking Josephson junction technology seriously, in view of IBM's much publicised work i the cryogenic superconductor area, Andy Wang commented, 'We are not working on Josephson technology, because its practical application is too far ahead in the future. Moreover, there are bound to be serious maintenance problems with Josephson-based machines, and I think they will only be used for špēciai systems."

in the much more prosaic present day area of MOS emory technology, Amdahl adopts a conservative app The main stores of its 470 machines are still built from 4K bit chips and the company will only start using 16K parts when they become theaper to use than 4K. About 70% of Amdahl's 4K chips come from Mostek and the rest from Texas Instruments and

# Build a better with the users of many microelectronics -

# NGROSYSIEMS'80

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Microsystems is a conference and exhibition which alerts industrialists and businessmen to the nature of this Second Industrial Revolution, and bridges the gap between the microelectronics expert and the engineers, scientists, systems designers, educationalists and others who use his skill and products. It is an open door to better business for suppliers of both hardware and software microprocessors, memories, interfaces, peripherals.

In its third year, it moves from a hotel show to the more spacious Wembley Conference Centre, with some 1,400M<sup>2</sup> of exhibition space.

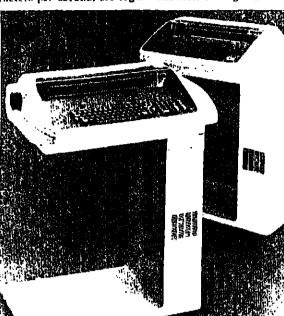
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#### **PRODUCT NOTES**

# New range of printers from Data General

racters per second, are logic send/receive configurations.



Cartridge cover

tridges can now be protected when off the drive by a security cartridge cover from Wespac. It fits over the base of front and side loading cartridges, pro-viding a seal to keep out dust and pollution.

Storage and stacking pro-blems are solved by the Wespac enables cartridges to be housed safely in vertical racks or stacked horizontally. It is made from lightweight low density

The cartridge cover costs £4.90 and quantity discounts are available.



A MINIATURE printer, which to the printhead for plotting pictures, diagrams and text of any kind, has been developed by English Numbering Machines. It is the FSP40 and The FSP40 measures 205 x occupies 400 square em of desk 210 x 105 mm, and weigh

Unaffected by vibration, the FSP40 can operate in any posi-tion, even upside down. It prints on electro-sensitive paper at rates of up to 280 characters per second. The print-out is clear and is not affected by water, temperature or infrared and altra violet light.

A built in microprocessor en-ables printing of upper and lower case characters in various styles and widths.

#### *Miniterms*

nortable terminals are available with removable storage media Both microprocessor based models are alike, except that the 1205 has the addition of the built-in acoustic coupler. They both feature a built in mini cassette tape unit with 68,000 characters and integral 8K randoin access memory expand-uble to 32K.

Teleprinter Equipment (CW), 70-82 Akeman Street, Tring, Herrs. HP23 6AJ, Tel: 0442 82

#### Floppy tray

FLOPPY discs can now be stored easily and inexpensively with the desk top tray introduced by Templestock. The truy can hold between 60 and 80 can be placed in trolleys or copying at a rate of 7,200 copies

A RANGE of terminal printers seeking and bidirectional plants been announced by Data General. They print at 180 characters per second are looked and looke the various printer functions such as tabbing features and variable character formats. Dasher TP2 printers are available in four models: RO model 6075 and KSR model 6077 print

> Data General (CW), Hounslow House, 724-734 London Road, Hounslow, Middlesex Tel: 01-572 7455,

in normal and elongated character widths; RO model 6076 and KSR model 6078 also print

condensed characters at 16.5 to

#### Data logger

THE Model 2200B data logge from Fluke has the ability to handle RTD inputs as well a standard thermocouple, vol ources. Other features includ nhanced alarm and trip facilties and a built -in 24 hour time

of day clock. Fluke International (CW) Colonial Way, Watford, Herts. Tel: Watford 40511,

#### Extel 951

THE Extel 951 microdisc is minidisc recorder featuring ex-tensive search and editing facilities. It will provide a storage capacity of over 200,000 ible disc, and offers full add, delete and replace editing on file contents and high speed searching for chosen strings of up to 15 characters. The Extel 951 is an RS 232C compatible

The Exchange Telegraph Company (CW), 73/75 Scrutton Street, London, EC2, Tel: 01-739 2041.

#### Intel kit

8086, its 16-bit micro rocessor, and at the same complete MCS-86 microcomputer system on a single board in kit form, and is deigned to enable engineers to gain experience of the hardware, architecture and machine code of the 8086. It contains all the necessary

tom in a few hours.
Intel Corp (UK) Lid (CW), 4
Botwoon Towns Rond, Cowley,
Oxford OX4 3NB. Tel O865 sion, Queensway, Enfield, 771431.



The FSP40 measures 205

3.6Kg It operates from a 12

English Numbering Machines (CW), Printer Divi-

RANK Xerox has introduced duplicators that incorporate microprocessors, the Xerox 9400, 5400 and 3400. The 9400 gives automatic double-sided 25,000 copies per month. All can be placed in trolleys or hanging frumes in cabinets. Also lockable lids can be supplied by Templestock.

Templestock (CW) 1

Ravenscourt Park, London W8

OTZ. Tel: 01-629 2533.





# The Whizzard family

vector refresh graphic systems known as the "Whizzard", which comprises graphic paripherals, graphic terminals and standilons graphic processing systems. The Whizzard 7000 series features a new

improved vector generator, and another fea-ture is the three dimensional rotation and an optional colour monitor. Four colours are standard, with an optional fifth colour available. The Whizzard 7000 incorporates all the standard features offered by the older

Megagraphic 7000 system.
For Nova or Eclipse owners, the Whizzard 5000 family offers refresh graphics with selective erase, translation, rotation, scaling

a stand-alone processor. RS 232C com municating terminal or dual board MG552 processor for installing within a customer's Nova or Eclipse computer. Whizzard 5014 systems are designed easily to replace, and be upward compatible with, the

Megatek Graphic software is a Fortra package which is designed to make the zzard a user oriented system.

Megatek (CW), 3931 Sorrento Vallay Boulevard, San Diego, California, 92121, USA, Tel (0101-714) 455 5590

#### Twinlock storage

TWINLOCK UK has introduced a varied range of pro-ducts for storing computer printonts. The range includes storage binders, filing storage units and storage trolleys.

Twinlock DP filing offers a choice of lateral or vertical suspension systems, and the Multi-Stor lateral filing cabinet allows a large filing capacity with the added benefit of security. The lockable quarter width doors protect the binders and save access space

The cupboard is 75 inches tall and will hold five tiers of standard depth binders. Also available is the side issue cabinet, with a lockable roller shutter door, and the universal trolley, suitable for conventio-

nal suspension files.
Twinlock (UK) (CW), 36
Croydon Road, Beckenham, Kent. Tel: 01-650 4818.

#### HP plotter

THE latest plotter from Hewlett-Packard, the HP 7225A, is able to provide hard copy graphics from microprocessor based systems. It can rovide publication quality lots by drawing clean con-inuous lines. The HP 7225A characters per second for quick

Hewlett-Packard (CW), King Street Lane, Winnersh, Wokingham RG11 5AR. Tel: Wokingham 784774, available on each plate. Daceward (CW), The Computer Centre, Bugbrooke Road, Gayton, Hants. Tel: Bilsworth 85888.

#### Kinson recorder

AN advanced programmable event recorder, developed by Kinson Electronics, is by Kinson Electronics, is occur designed to capture event data in medical and industrial Kin

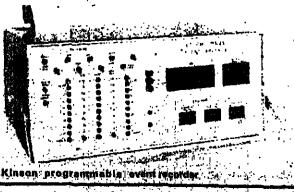
#### **Decuriter** IV from Rair

AN addition to the Rair range of Digital Equipment terminals is the Decwriter IV, a 300 band desk top terminal, which prints at speeds of up to 45 chps, Small and lightweight, it is designed for operator convenience, and e of its main features is its ability to act as firmware from options for speci the keyboard or the host com-

£900, or can be rented from ties, and program output Rair (CW), 30-32 Neal Street, Glaziera Lane, Normandy London, WC2, Tel: 01-836-4663. rey, Tel: Normandy 2432.

COMPUTER terminal sockets are now available from Daceward, The TSKT series are for RS 232C type terminals. They comprise white rectangu-Inuous lines. The HP 7225A lar plates compatible in style and fitting with MK's range of coints and will generate three electrical outlets and boxes. One, two or four sockets are avoilable on each plate.

sta in medical and Industrial Kinson Electronics (CW), 17
pplications. It is known as Wellington House, Eton Road, how Model 4001 and con-



The HP 3076A

and in offices, Hewlett-Packard has introduced a range of three data terminals. The HP 3075A is a desktop terminal for applications such as finance, stock control and purchasing.

A wall mounted version, the HP 3076A, may be fitted with a multifunction reader and printer so that it can be used to record work in progress in a machine shop. The HP 3077A, also a wall mounted unit, may be used for employee time reporting or to control access to restricted areas.

Options include a choice of numeric or alphantimesic kay and products in the suitance and products in the suitance are suitance

### TV camera systems

GRAPHIC Display Systems of Cambridge has introduced two models, the GDS-2000A and the cambridge has a system of the cambridge has been seen as a system of GDS-2000 range of TV camer stems. The basic GDS-2000 conste

of a TV camera mounted on hand, pivot-hinged to the da play. The GDS-2000A has more sophisticated mour giving multi-lens, variable image magnification feature with the optional use of a zone

The GDS-2000H, using a broadcast quality captic camera has the same mount. arrangement and a high rest, tion and prices are from (70) Graphic Display System, a Hemingford Road, Cambridge Tel: 0223-51645.

#### **Rastoriser**

MEGATEK's Rastoriser is , ectrostatic printer plotter in terface that produces hardow, for the Megraphic 7000 vector refresh terminal in 10-15 seconds. The Megraphic 703 graphics system features refresh memory, 12 bit resolution and a 32 bit micro-base controller. Optionally available are select erase hardware translation, blinking and dushed line with harden potnte, scale, clip and zona s

options.
Megatek (CW), 3931 Surento Valley Blvd, San Buga California, 92121, USA, Id

#### **Keyboard** A MICROPROCESSOR con

work has been amound? machine tool user v !be used by an operator r and editing, Featt uter. dividual requirements
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switching. Also required are exponents of 'software physics' and the art of

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Salary Negotiable

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We have been retained by a large international manufacturing group to recruit a Systems Analyst to design and develop commercial applications, incorporating database techniques. Candidates must have a minimum of five years d.p. experience and have been involved in the design and implementation of at least one system from start to finish. A background of manufacturing and accounting applications would be ideal. Salary is negotiable according to experience. Large Company benefits including

relocation assistance where appropriate Contact: Mike Creamer

For further information on any of the above vacancies, please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact as anyway. JAMES BAKER ASSOCIATES, International Personnel Consultants, 32 Savile Row, London W.1. Tel: 01-439 9311.

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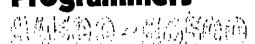
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OF LANGASTER Applications are enried for the not of LECTURER to the DEPARTMENT OF COMPUTER STUDIES. Pre-lurance will be given to those can-didates with experience of micro-

iricessom Seleny on the scale £4333-£8992. Further particulers may be obtained (questing reference 1.53/C) from the translation may be considered to the translation of th

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# COBOL Programmers (Univac) DM 50,000

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Opportunity for software design engineers to work on very advanced word processing systems in Munich for at least I year. Knowledge and experience of ASSEMBLER or PLM is required. We also have requirements for micro processor engineers elsewhere in Europe, so please call us for more information.

Contact: Mike Creamer or Andy Wright



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Middlesex

Up to £9,000

Our client is a leading international company in the design and development of engineering products for a wide range of industries. The company has several manufacturing plants throughout the UK but all data processing is centred in Middlesex.

They have an IBM 370/138 running under DOS/VS with CICS on line enquiry and up date applications running. Recently a feasibility study has been completed for a complex on-line order processing system using DL/t and two senior system analysts are now required to join the development team. It is estimated that implementation of this system, part of a major e.d.p. development plan, will take two years.

Candidates should ideally have an industrial background and have designed and implemented at least one major system. More importantly, the positions will demand a high degree of business sense and ability to maximise the efficiency and ultimate flexibility of the system. The company have a sound reputation for good training and employ modern techniques, including audio/visual aids, for this purpose,

This represents a wonderful opportunity to apply creative ability in an interesting design project which will be a valuable career contribution. Contact: Mike Creamer

For further information on any of the above vacancies, please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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Currently we operate IBM system 3, model 15D but we shall be upgrading this to a system 38 in 1980. We are looking for a mature, self-metivated man or woman, who would revel in the challenges of such a change. He/she must also be able to communicate effectively, with user management and have a good general communicate officially with background. Experience of RPG2 is essential and if you have a knowledge of IBM systems 3 and/or CCP, so much the better. For the right person, salary will not be an obstacle, and the opportunities for career development are excellent. The Company benefits include a generous annual bonus, free life assurance and assistance in relocation.

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NERC CENTRAL COMPUTING

#### **ASSISTANT** SCIENTIFIC OFFICER

The NERC Central Companing Group has a watercy for an Assertant Scientific Officer to work at the Rutherford Laboratory, Childron rate Dirton, Oxon Tito post will involve providing general user support for the University appoint of disting major software wystems. Best furding and job tracking when problems are:

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the furberient Lateratory to most of the

LIVERPOOL POLYTECHNIC Department of Architecture

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mer to work with a team developing computer asseted loarning programs for design education. The work is financed by the Nullield

The successful applicant will be expected to contribute ideas, to develop programs and to take responsibility for the co-ordination and documentation of the team's work. Solary scale: £2511-£2967 + £312 p.a.

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Application forms and further particulars are evallable from the Staff Office, Liverpool Polytechnic, Richmond House, 1 Rumford Pisce, Liverpool L3 SRH. Telephone: 051-227 5581 Ext. 43. Closing data is fourteen days from the appayertisement.

THE CITY UNIVERSITY

**Department of Computer Science** 

#### SRC RESEARCH STUDENTSHIP

applications are invited for an SRC Research Studentship to investigate Braille translation. This project, in collaboration with the Royal National institute for the Blind, aims to produce a low-cost office machine capable of accepting typewriter input, and orming Braille on a refreshable Braille display.

Candidates would normally be required to have a good lonours Degree in computer science or electronics

Applications, together with the names of two referees, should be submitted as soon as possible to Dr. G. R. Dowling, Department of Computer Science, The City University, Northampton Squara, London, ECTV OHB, from whom further erticulars may be obtained.

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At present the company operates an IBM 370 mainframe running under DOS/VS, POWER and CICS. However, a 4331 and a 4341, with DOS/VSE software, are on order and are due for installation in the near future.

This is an ideal opportunity for a person seeking career advancement in a dynamic installation, and the successful candidate may expect to progress to Project Manager status in the near future. As one would expect of a major international organisation relocation expenses will be offered where appropriate.

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COBOL programming experience and whilst knowledge of

IBM equipment is preferable the company runs a compre-

hensive training scheme for those with other machine background. Initially much of the work will involve redevelopment

of financial systems and a knowledge in this area would

£6000-£7500

Our client is an independent organisation with a worldwide operation controlled from the United Kingdom. For the last century they have been innovators in their field supplying plant to the power and process industries throughout the world. Even in the weak business climate of recent years the group has managed to substantially increase turnover and profitability with its careful investment policy. In line with this expansion the company has recently upgraded to an IBM 370/158-3. Accordingly to cope with their active development programme they are seeking the following professional staff.

#### **PROGRAMMERS**

therefore be a distinct advantage.

#### c£6000

#### SENIOR PROGRAMMERS

c£7500

This is a senior position responsible for a staff of up to eight people. The successful candidate will have at least five years' IBM OS COBOL and preferably be conversant with Assembler. Since a degree of new development will be on-line, a knowledge of CICS in a financial environment will obviously be

In addition to competitive commencing salaries, the company has an active social club with subsidised bar, snooker tables, and usual amenities, with facilities for squash and most other sports available. For those wishing to move, a generous relocation package is Offered. Added to this the successful candidates have a real opportunity to progress their career in a highly successful British

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- \* Data Base Systems \* System Resource Sharing
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large communications based systems with emphasis on distributed processing. You will have working knowledge of the major communications protocols and systems. Expertise should also include:

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# You will have experience in the setting up of

- \* Network Planning

To make the most of these top-level opportunities you will be the kind of person motivated by challenge and opportunity. You will be part of an exclusive team that you will help to recruit. You must be an innovator and yet be aware of realistic budget constraints. You

You will have experience gained in a major electronics design project. You will also have experience in at least two of the following:

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- \* System Switching Techniques
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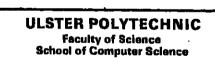
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Contact Owen Kelly on 061-832 4211



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School of Computer Science. The School runs an Honours Degree Course in Computer Science (Data Processing), a Diploma in Computer Education, and HND Course in Computer Studies, and BCS Professional Purses: Il also contributes to Degree Courses in Business Studies. Accounting and other courses at higher degree, degree and diploma level throughout the

Specialisations which are of particular interest for these posts are Data Processing, Systems Analysis, Management Information Systems, Data-base Computation and Theory, Computer Architecture.

Applicants for the posts should be graduates with relevant industrial experience. Research and consultancy are encouraged.

The Polytechnic is a direct grant institution with an independent Board of Governors. It opened in 1971 and has a student population of some 7,500. It has extensive new purpose-built accommodation, including 760 residential places on the 114-acre campus overlooking the sea at Jordanstown, a pleasant and quiet residential area. There is a scheme of assistance with removal.

Further particulars and application forms which must be returned by August 27th may be obtained by telephoning Whiteabbey (0231) 65131, Ext. 2243 or

The Establishment Officer, Ulster Polytechnic, Shore Road, NEWTOWNABBEY, Co. Antrim BT37

### **SENIOR COMPUTER OPPORTUNITIES** IRELAND

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programming and/or systems experience — coupled with a keen desire to work with state-of-the-art technology you will qualify for

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# APPOINTMENTS IN IRELAND SCOOL

upgrading its image to

expanding DP community.

It acts as an interface to the

EEC and is currently in-



WiTH the fastest growing economy and the lowest density population in the EEC, says PAT RAFTER, Ireland also has a booming computer industry.

Several large US companies manufacture there, and the industry will be needing far more computer professionals than the Republic can provide.

Pat Rafter has 20 years' experience in the computer business including eight with Honeywell,

two of them as general manager for the whole of ireland. In 1977 he formed IMPC Ireland, a

management, marketing and personnal consultancy, in association with insight of London.

# Wanted-400 more programmers a year

article entitled Ireland 500 by 1983, Employment at Needs to Attract its Ex. the Galway plant is in expatriates, I highlighted the cess of 1,000. increasing shortage of skilsuggested that one way to reduce the shortfall was through attracting home expatriate personnel and others from overseus, who through their skills and experience could make a the most dynamic and rapidly growing industry

Ireland has a lot to offer to netic cards and mini-discs. the prospective immigrant life and a relatively stressfree environment in which to bring up one's children and enjoy leisure time.

I could conservatively estimate that at least 6.000 ists in the manufacturing sector of the industry. With ceeding 30% in the home export bias.

an example of the level and puter professionals.

nvestment is about £42 year.

plant at Clonmel and employment there is ex- pany are now establishing energetic guidance of the

Computer Weekly, in an current level of 50 to over pete for this substantial Owen Dalton, the Irish tions. further demand for com-The momentum of these

Amdahl. Amdahl will shortly move to a perevents has taken some time manent plant in North to build up and many or-Dublin from temporary preganisations, including mises, and its employment level rise from 250 by end-1979 to over 750 by 1983. Verbatim. Verbatim

Corp, a manufacturer of and his family in terms of than 100 people, the comrsonal freedom, quality of pany has plans to build a of overseas personnel. five-factory complex at the Raheen industrial estate in Limerick and expand to 1,400 people in employment

the software industry to establish business units in As part of the incentive the growth rate now ex- Ireland, particularly with an to attract Mostek to Lire,

grammer alone will be in businesses such as the leges of higher education. excess of 400 a year for at recently formed Interactive The recent National least the next five years. Computing Limited, a which brings us to 1984. Digital agency and PDP-11 vertised widely in the UK As an indication of the based interactive bureau, and entitled The Good Life, level of activity currently which over the next two is an example of the recoginfluencing developments, years will probably employ nition of a need to attract ving projects are a staff of at least 20 com-

gency, the Industrial De- one manufacturer plans to ment in Eire to the extent of Mostek. The Dallas-based users, and it is conser- family Mostek Corp set up an advanteely estimated that a AnCo (the Industrial vance plant in North Dublin total of over 200 systems Training Centre) was testing microprocessors in will be installed for new uly, 1979. Total capital users country-wide this

million. Plans are to Against this background creasing its training facilearly 1980 and the total opportunity for computer computer personnel. ment should reach manufacturers and sup-Digital. The Digital expanding. Others new to munity awareness are the Equipment Company is Ireland such as Hewlett- Irish Computer Society and now operational in its new Packard, Redifon, and the the CIJEC. mnuter Machinery Com-

stituting a drive to encougovernments, tend to act after the event. However, the significance and importance of these deveentitled Crash Training Programme for Computer computer industry.

lopments in terms of added significant contribution to removable magnetic data value and employment to storage media, has set up an the economy is now well limerick. It manufactures Irish government, and With the fastest growing such products as cassettes, through its agencies it is economy in the EEC and the data cartridges, floppy also making additional lowest density population, discs, mini-cassettes, mag- funds available and developing programmes to in-Currently employing more crease education levels and encourage the participation

The following are examples of some of the projects
The IDA has recently

allocated some £3 million to Another area in which the the universities and techninew jobs will be generated IDA is contributing to the cal colleges to encourage in 1980 alone for electronic growth of computing in lie- them to expand their comland is that of incentives to puter education pro-

the Irish government is computer market, it is estimated that the shortfall of computer personnel at the basic level of computer pro-

I understand that the milment on the part of the government through its agency, the Industrial Day one manufactures plant the small business systems market is now a major government will now subsidise relocation costs for growth area. In 1979 alone, agency, the Industrial Day one manufactures plant to lopment Authority (IDA) install 50 systems for new approximately £2,000 per

Training Centre) was recently allocated an additional £1.7 million in the manufacture silicon chips in there is a recognisable lities for electronic and

> Two bodies which also pliers, most of which are reflect a growing com-

Salary band	Bonus .	Total ~ income	Fringe benefits
£12,000-£18,000	Possible year and 10%-20% of gross		Company car
£8,000-£10,000	Possible year-end 5%-10% of gross	e£10,300	Car allowance
£11,000-£14,000	Possible year-end 7%-10% of gross	c£13,000	Company car
£6,000-£7,000	£6,000+	c£12,000	+ Company ca
£7,300-£8,300		0£8,000	Car allowance £90-£120 p.m
£6.300-£7.300		c£7,000	Overtime paid
£8,000-£9,000		a£8,500	Company car
£6,000-£7,500		g£7,000	Company car Overtime paid
£5,000-£6,500		ç£6,000	Company car Overtime paid
	£12,000-£18,000 £8,000-£10,000 £11,000-£14,000 £6,000-£7,000 £7,300-£8,300 £6,300-£7,300 £8,000-£9,000 £6,000-£7,500	£12,000-£18,000 Possible year-end 10%-20% of gross £8,000-£10,000 Possible year-end 5%-10% of gross £11,000-£14,000 Possible year-end 7%-10% of gross £6,000-£7,000 £6,000+ £7,300-£8,300 — £6,300-£7,300 — £6,000-£7,500 —	£12,000-£18,000 Possible year-and c£15,000  £8,000-£10,000 Possible year-and 5%-10% of gross  £11,000-£14,000 Possible year-and 7%-10% of gross  £6,000-£7,000 £6,000+ c£12,000  £7,300-£8,300 — c£7,000  £8,000-£7,500 — c£8,000  £8,000-£7,500 — c£8,000

The Computer Industry Computer Society is

relate to the needs of our CIJEC, was formed in late provision of education facilities by the government through universities, col-The society's education leges and schools. It is comsub-committee has pro- posed of representatives of duced two excellent reports. most if not all of the organisations associated with the

The organisations are the rammers, and Proposal Irish-based facility in and truly understood by the for Infra-Structure of Com- Irish Computer Society, the vancement in secure

puter Users, the Confedera-

tion of Irish Industry, the National Board of Science and Technology, the Irish Computer Association and the Irish Business Efficiency and Trade Association.

To summarise, then, the clear message to our expatriates and overseas colleagues is that in Ireland opportunities for cureer ad-

Irish Federation of Com- employment and chances to expand your experience.

Salary and income packages are also geared to attract the professional and are conservatively es-timated to be at least 20% higher than for comparable positions in the UK. This trend is evident in Figure 1. which serves to illustrate some typical income levels. Obviously these can only be taken as a guideline, as approximate mid-points in salary bands have been

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2) Nominal terliger.
3) Library cuculation control in as expected that the successful can defate will initially work on student records but quild infimitally by any love.

records but could internitry to interview in any or all of the project atoms. Experience of this type of work would be an arivantage as would experience of COBOL and/or CTL equipment but the main requirement is for an intelligent occupancy of the control of the country without constant supervision.

without constant supervision stating salary at appropriate point on scale £4333-£7521 (under review) according to age and experience, plus FSSU 'USS Prespects of promotion to a higher grade in due course are good.

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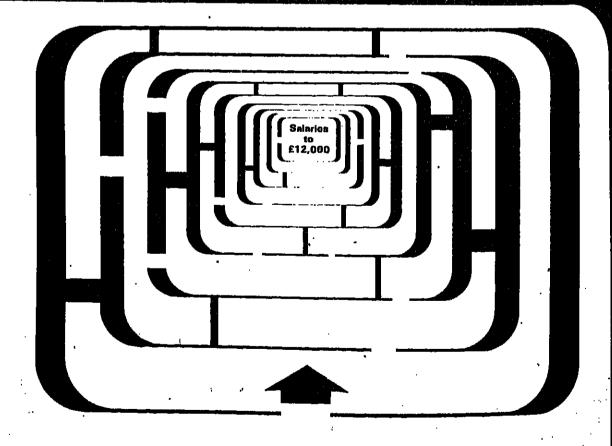
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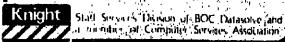
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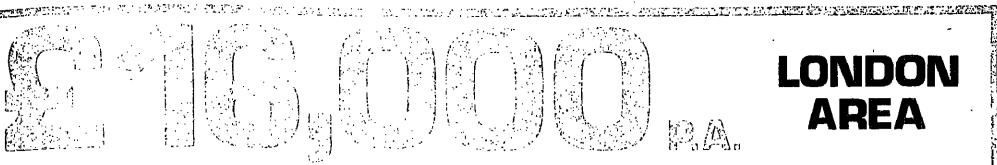
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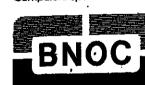
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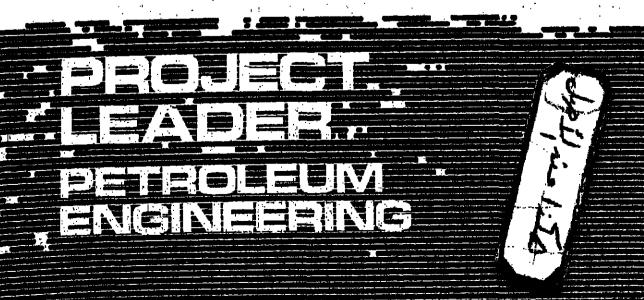
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The appointment will be for up to threel years in the first instance, from the aconst date that can be arranged. The salary will, from October 1. 1879, be on the scalar C2.776-59, 365 per andum of pro rots for Part-time plus USDPS-banelits, the commancing selary dispending of oge and experience. Further perfectlers and explication forms [2 copies) may be obtained from the Personnel Officer, University College of Swetman, Singleton Park, Switches Sar ARP, or whom they should be reticized by Friday, August 31, 1878.

# **DATA PROCESS**

A Public Company requires for its North West London subsidiary a Data Processing Supervisor/Analyst to operate its computer systems. After a period of amiliarisation it is envisaged that further work in developing programmes for the Group as a whole will

The successful candidate (male/female) will probably be a graduate with a computer sciences degree or statistical training to degree or HNC level seeking to gain experience in operational analysis.

Salary will be fully commensurate with the respon-sibilities of the post, together with fringe benefits which include a contributory pension scheme. Applications with details of background and ex-

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- New post

This small engineering company currently uses a mini computer for a limited range of commercial accounting applications. The company, which has recently joined a substantial diversified group, now wishes to implement production planning and control systems; using the hardware and technical resources of the group.

The Systems Controller will be the top DP person and will report to a Senior Managor, whilst having close working links with the Group Systems Manager.

The position requires a systems background, preferably with experience of production systems. Whilst the person appointed must be technically competent, a determined and persuasive personality is of equal importance. Relocation expenses will be paid.

To apply, please write or ring, asking for Neville John on 01-242 9356 (day) or Farnborough (Kent) 52880 (evenings and weekends), quoting Ref: 757/CW.

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Contact PATSY BARNES at CROYDON for further information

Positions open to male & famale applicants, please telephono (24 hour service) for unital discussion or write to address below. QUOTE REP. CW18849

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#### SOFTWARE **PROGRAMMER KINGSTON**

SYSTEMS DEPARTMENT, we have a vacancy for a SOFTWARE PROGRAMMER with mini

The Department currently operates an ICL 1906S - 384K, under George 3. An ICL 2960 and a range of mini-computers are used for new

The requirement is for a SOFTWARE PROGRAMMER with at least one years' experience to work on development of a network of minis, communicating with mainframes. The successful candidate is likely to have the

Programming experience on a mini (high level language or assembler), preferably PDP-11 or VAX-11 under standard operating systems.

A relevant degree or professional qualification. The ability to communicate with management,

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FOR SWITZERLAND

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Starting salary in accordance with qualifications and experience. Relocation expenses considered Telephone or write immediately for application form enclosing addressed envelope and quality reference no: 1530/C to Appointments Department BBC, London WIA IAA Telephone: 01-580 4468, Ext: 4619.

BBC

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to take responsibility for a small Data Processing and System Department using an ICL 7502 and 7503 connected the 2880 running under DME in the north-west of England Responsibilities will include all developmen maintenance of a wide range of applications

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This is an opportunity for someone to develop with the planned expansion of

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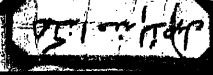
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To compliment the above position with good knowledge of GCOS preferred Same large company benefits apply .



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Applications are invited for the above post to assist staff and students in their teaching and research activities. The post principally involves designing constructing, lesting and maintaining electronic equipment in the digital patterns legislations.

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Applications in writing giving the names and eridinesses of two rolurers, and sperifying the post to which application rolers should reach the Deputy Bursoi. University of York: Hoshington, York YO? SDD, by Windinesity: 15 August 1879.

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For the design and implementation of commercial systems project control, 5 years DP experience required with at least 1 year systems experience. Salary range R725-R1190 per month. The Company operates an ICL 2972 computer

Attractive employee benefits are offered, including assistance with relocation expenses. Candidates appointed will nornially be expected to obtain permanent residence permits but employment on a temporary work permit basis for a minimum of 2 years may be considered.

Interviews will be held in London between 29th August and 7th September 1979 at the offices of the Group's associated company. Consolidated Gold Fields Limited. Please write, with brief relevant particulars, to -



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Standard Telephones and Cables seeks a young ambitious computer professional to fill a vacancy for a Training Officer in its Information Systems Division.

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The Training Officer is required to present courses on subjects including Computer Concepts, Job Control Language, Programming, Financial Modelling and Time-Sharing Operation and also to provide on-the-job-training during mini-computer

A solid data processing background is required combined with some experience of the preparation and presentation of

A competitive salary is offered along with large company benefits, the location is the North London/Herts border. Please telephone or write to Mrs G Lavelle, Ref. REB7, Recruitment Department, Standard Telephones and Cables Limited, Oakleigh Road South, New Southgate, London N11 1HB. Tel 01-368 1234 Ex. 2263.:

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Unioneil Company of Great Britain, a subsidiary of Union Oil Company of California, wishes to engage a Programmer for the Computer Services Department at the Sunbury-on-Thames Head Office. This position, in a recently established department, offersa unique opportunity for professional challenge and scope.
Initial responsibilities include commercial programming for

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This position offers an excellent salary and benefits package and interesting career opportunities with an international oil exploration and production company.

Additional benefits of this position will be the experience gained on our in-house computer, which currently controls an on-line and multiple site environment.

Interested persons should respond in writing to the address below. All responses will be held in strict confidence.

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pplication forms and furthe application forms and suffice particulars may be obtained from H. R. Cleyton, Sonior Assistant Registrar, The University, Canterbury, Koni CT2 7NZ (Tel Canterbury 68822 Ext. 2631 (2010) page 2824 Ext. 2631 263), quoting reference M79/ 13, to whom completed applica-tions should be returned not Later than 24 August 1979

# RPG II PROGRAMMER

- sition has been created for is programmer to join a small team within an ax panding D.P. Department, shortly to be relocated in new modern offices.
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Methods Here you will be involved in providing advanced computer based theoretical modelling

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You will be responsible for providing computer based geometric data, handling systems applicable to draughting 3D mechanical design, and surface definition.

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Salaries offered are in a range up to £6,000 per annum for Programmers and up to £7,000 per annum for Senior Programmers.

We cannot emphasise too strongly the attraction of working in this environment. If you have a minimum of one years' experience in COBOL or other modern commercial languages, we would like to hear from you to discuss the positions in more detail. Please contact Michael Sands or Sara Taverner by telephoning 01-828 5356 or writing to them at the address below Ref. 0110/CW

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numover in excess of £112m, are starting work on a innover in excess of Alpin, are starting work on a major long term development plan involving distributed processing throughout the UK. The early and major part of this plan is the setting up of a centre at Berkhamsted based on a PDP11/34. This will later be extended by the use of micros in branches linked with the agent?

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CHIEF EXECUTIVE'S DEPARTMENT

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To be involved in programming for the Hospital Admin

appointed but on a lower scale.

Grampian are developing a network of communicating Grampian are developing a network of communicating machines, the main ones being two ICL 2904's (programmed in COBOL) and a CTL Mod 1 (programmed in FORTRAN and using a Codasyl database management system). Links to enotive ICL 2903 and a microprocessor exist, and further links are being developed to Orkney and Shelland. Use is also made of the Aberdeen University's Honeywell Level 66: Further information concerning these posts may be obtained from Ken Allen, phone 0224-681818, Ext. 2977,

Application form and further details may be obtained from: The Area Personnel Officer, Gramplen Health Board, 1 Albyn Place, ABERDEEN, to whom completed applications should be returned by August 31, 1979.

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Further particulars and application forms may be obtained from the Administrative Assistant (Establishment). Dundes College of Technology, Bell Street. Dundes, DD1 1HG, with whom applications should be lodged not later than September 7, 1879.

#### UNIVERSITY OF YORK

**Department of Computer Science** 

#### **SRC CASE RESEARCH** STUDENTSHIP

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Applications are invited from candidates with a good honours degree in engineering or science who wish to research in the area of

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Further details and application forms can be obtained

Dr A. J. Willmott Department of Computer Science University of York Heslington York YOL 5DD



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Applicants will have a strong operations background with a high level of technical expertise. The successfut candidate will assign and supervise operating and data control staff and Date Creation (Inforex) and operating priorities. He/she will be expected to play a major part in the conversion from a 1 900 to a

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MONEY MATTERS-1

about!" pronouncement is

basically a conceited one. It

of the topic concerned; an

absolute scope of informa-

tion and experience at the

JC level - and a don't mean

The only reason I make

this remark is to emphasise

my reluctance and inse-

curity in making a fairly

emphatic statement on the

However, armed with the

disclaimer of being obliged

to say something in order to

emphasise the main point of

related aspects of selling,

appearing arrogant.

have to run the risk of

"The essence of selling is the identification and satis-

faction of a need in return

for a payment." I know that

Jimmy Carter!

topic of selling.

Heart of the

THE SALES AND

MARKETING BIT

UMIVERBITY OF ARERDYES COMPUTING CENTRL

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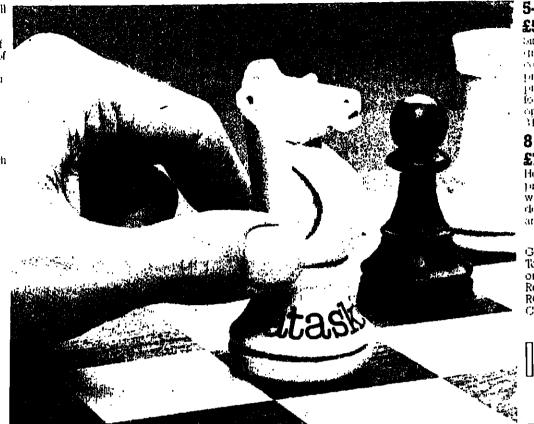
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one can easily and reasonably modify this statement in dozens of ways, but I believe this is the heart of the selling process — whether one is involved with nuclear power stations or the SOUTH-WEST UNIVERSITIES world's oldest profession. REGIONAL COMPUTER CENTRE If I was obliged to aug-

MICROPROCESSOR

ions: "The essence of selling is the continual iden-SOFTWARE UNIT uncation and satisfaction of needs in return for reasonable payment within on acceptable timescale."

One of the baggest problems of running a business s maintaining a balanced and positive flow of cash so that one has sufficient liquid assets to cover all debts due for immediate payment, with particular emphasis on supplies, rent and payroll. Certainly no company can afford to expose itself in financial terms to either the vagaries of market, production and sales fluctuations, or the

ardiness of its debtors. I therefore find it astonishing that so many salesmen believe — and their com-

selling process THE "That's what it's all panies don't dispute - that the flow rate of orders and money into the company is presumes a total knowledge not their problem. As long as they reach their targets by selling at a competitive price and the company eventually gets paid, they believe they are fulfilling their obligations. Yet the possible implications of such an attitude can be

> Consider the matter from a production point of view One thing guaranteed to create absolute chaos for those people generating the end-product is a violent and unpredictable fluctuation in deniand. The ensuing probloms in terms of labour and materials can be consider able, if not disastrous, Such an inconsistency of demand s often created by an unpredictable flow of orders which, in turn, typically comes from an erratic seling pattern generated by haphazard sales prospec-

horrendous.

Meanwhile, someone has to cope with late deliveries and turning away business Squaeity, or someone has to first reaction would be to pay the employees and the add the following qualificarent when the production-

line grands to a half Tor many salesmen, sale prospecting is an activity which take place when one runs out of prospects. The implications of this attitude on the related frequency of incoming orders compared with the consistent effect of regular prospecting, should

he obvious. One can reasonably argue that the importance of ongoing sales prospecting becomes less us the sales cycle extends, but by and large the salesman who sees prospecting as a spasmodic also one who is making a valid contribution towards

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Two types of control card allow for linking of either an alphanumeric Sodeco PR. Industrial components di printer with an Ascil data



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Puzzle Answer

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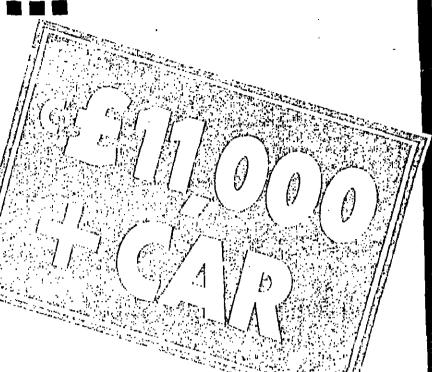
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